Viejas Hotel Project TEIR

Appendix C

Air Quality Conformity Assessment

Prepared by Investigative Science and Engineering, Inc.

December 2, 2011

DRAFT AIR QUALITY CONFORMITY ASSESSMENT
VIEJAS HOTEL PROJECT
SAN DIEGO, CA

Submitted to:

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The proposed Viejas Hotel site consists of approximately 2.5 acres, located at 5000 Willows Road, within the Viejas Indian Reservation (a Federal Reservation) in eastern San Diego County (refer to Figure 1 on the following page). The site is directly east of the existing Viejas Casino structure and north of the Viejas Outlet Center (shown as the red hatched area in Figure 2 on Page 3 of this report). Regional access to the site is obtained from Willows Road, via U.S. Interstate 8 (I-8).

The Viejas Hotel site is a fully disturbed land use having a mean elevation of approximately 2,320 feet above mean sea level (MSL) and residing within the footprint area of a temporary bingo pavilion structure. The site is entirely enclosed by reservation property and is surrounded by parking lots, a central plant, and a site maintenance building (refer again to Figure 2).

Project Description

The project under examination is an approximately 156-room (150 guest rooms plus approximately six facilities use spaces), 65-foot tall, five-story hotel, to be built adjacent, and connecting to the existing Viejas Casino. The footprint of the proposed hotel structure is shown in Figure 3 on Page 4 of this report as a blue hatched-in area. The maximum disturbance area of the project is shown as the red hatched-in area within Figure 3. Approximately 7,200 sq ft of additional seating for the existing buffet restaurant, along with a connection between the hotel and casino, will also be provided as part of this project.

Onsite construction would consist of minimal remedial grading and contouring to facilitate the hotel foundation, as well to realign existing surface roadways around the proposed building. The existing temporary bingo pavilion (a sprung-style tent structure) would be disassembled and removed from the site. Site clearing and grading would occur over an approximate 60-day work period.

Air Quality Definitions

Air quality is defined by ambient air concentrations of specific pollutants determined by the Environmental Protection Agency (EPA) to be of concern with respect to the health and welfare of the public.[1] The subject pollutants, which are monitored by the EPA, are Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ozone (O_3), respirable 10- and 2.5-micron particulate matter (PM_{10}), Volatile Organic Compounds (VOC), Reactive Organic Gasses (ROG), Hydrogen Sulfide (H_2S), sulfates, lead, and visibility reducing particles.

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[1] Per the Federal Clean Air Act of 1970 (United States Code, Title 42, Chapter 85) and subsequent amendments.

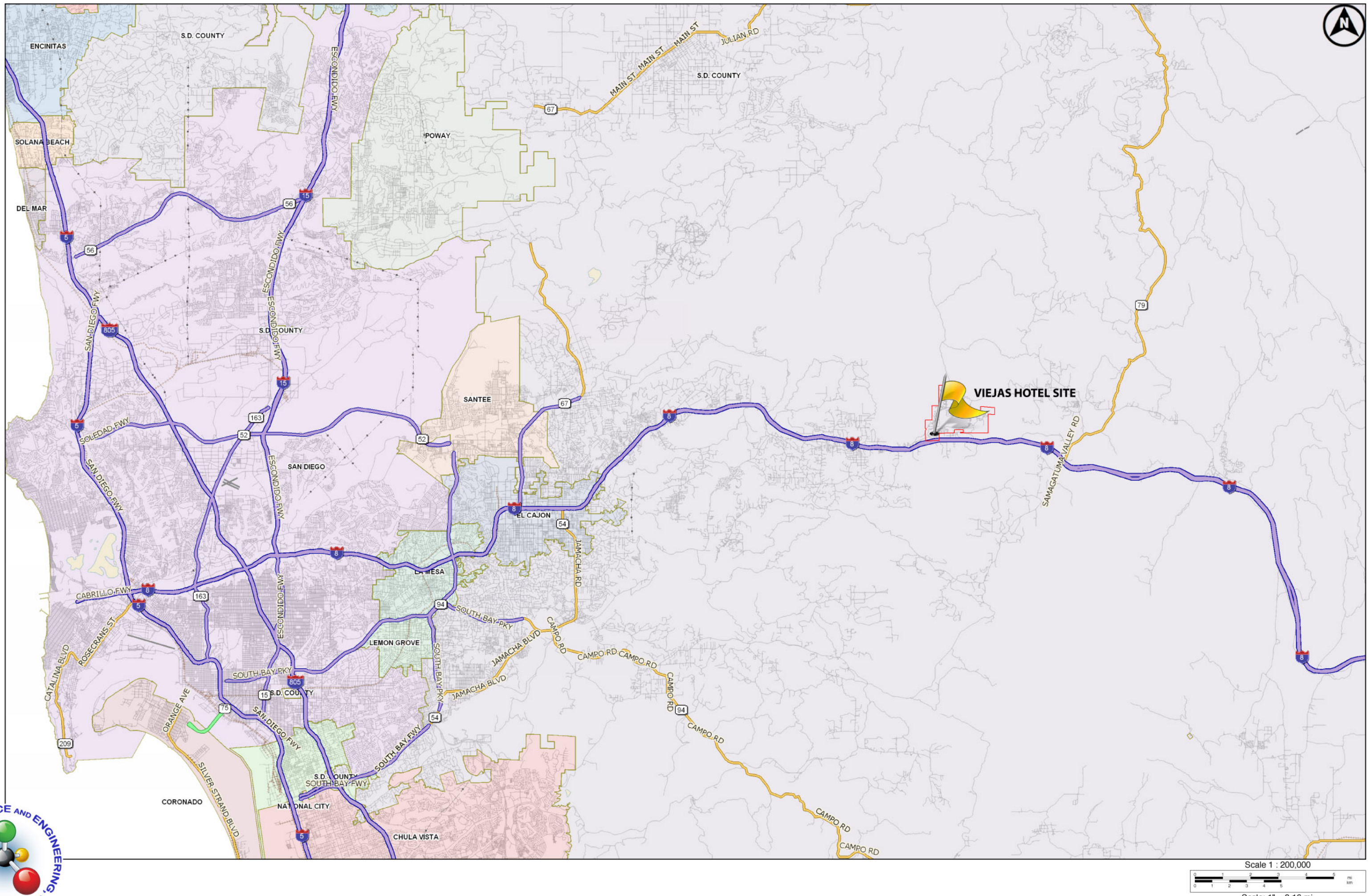

FIGURE 1: Project Study Area Vicinity Map (ISE 12/11)

FIGURE 2: Aerial Image Showing Proposed Development Area (ISE 12/11)

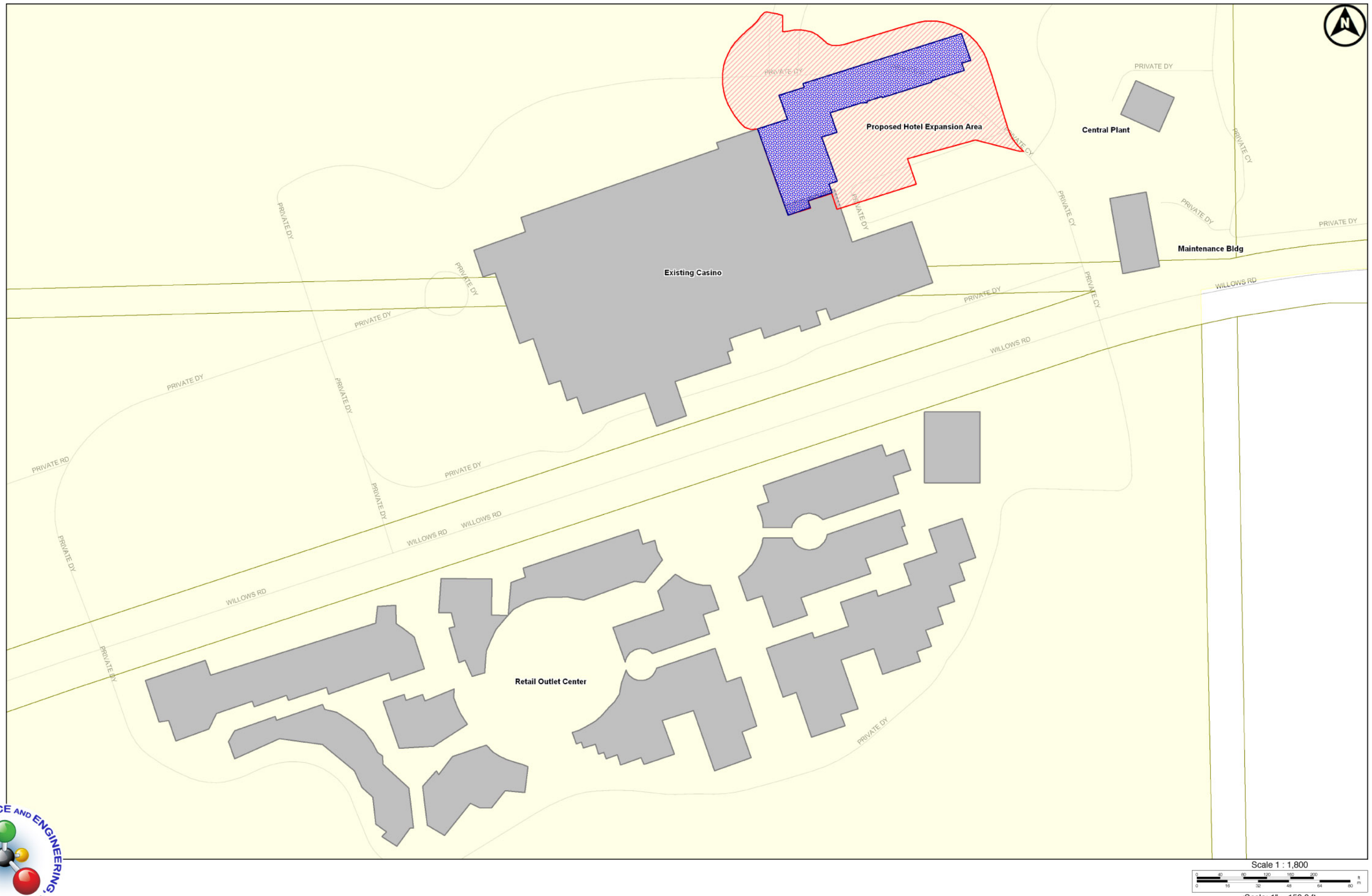

FIGURE 3: Proposed Viejas Hotel Footprint within Development Area (ISE 12/11)

Examples of these EPA monitored pollutant sources and their effects on localized air quality are discussed below:

Carbon Monoxide (CO): Carbon monoxide is a colorless, odorless, tasteless and toxic gas resulting from the incomplete combustion of fossil fuels. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant.

Oxides of Sulfur (SO_x): Typically strong smelling, colorless gases that are formed by the combustion of fossil fuels. SO_2 and other sulfur oxides contribute to the problem of acid deposition. SO_2 is a criteria pollutant.

Nitrogen Oxides (Oxides of Nitrogen, or NO_x): Nitrogen oxides (NO_x) consist of nitric oxide (NO), nitrogen dioxide (NO_2), and nitrous oxide (N_2O); these are formed when nitrogen (N_2) combines with oxygen (O_2). Their lifespans in the atmosphere range from one to seven days for nitric oxide and nitrogen dioxide, and 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects. It absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.

Ozone (O_3): A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer, as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

PM_{10} (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs, where they may be deposited, resulting in adverse health effects. PM_{10} also causes visibility reduction and is a criteria air pollutant.

$PM_{2.5}$ (Particulate Matter less than 2.5 microns): A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from SO_2 release from power plants and industrial facilities, and nitrates that are formed from NO_x release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions.

Volatile Organic Compounds (VOC): Volatile organic compounds are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOC's contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels of reactivity; that is, they do not react at the same speed or do not form ozone to the same extent, when exposed to photochemical processes. VOC's often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

Reactive Organic Gasses (ROG): Similar to VOC, Reactive Organic Gasses (ROG) are also precursors in forming ozone, and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight.

Hydrogen Sulfide (H_2S): A colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It often results when bacteria break down organic matter in the absence of oxygen. High concentrations of 500-800 ppm can be fatal and lower levels cause eye irritation and other respiratory effects.

Sulfates: An inorganic ion that is generally naturally occurring and is one of several classifications of minerals containing positive sulfur ions bonded to negative oxygen ions.

Lead: A malleable, metallic element of bluish-white appearance that readily oxidizes to a grayish color. Lead is a toxic substance that can cause damage to the nervous system or blood cells. The use of lead in gasoline, paints, and plumbing compounds has been strictly regulated or eliminated, such that today it poses a very small risk.

Visibility Reducing Particles (VRP): VRP's are just what the name implies, namely, small particles that occlude visibility and/or increase glare or haziness. Since sulfate emissions (notably SO_2) have been found to be a significant contributor to visibility-reducing particles, Congress mandated reductions in annual emissions of SO_2 from fossil fuels starting in 1995.

The EPA has established ambient air quality standards for these pollutants. These standards are called the National Ambient Air Quality Standards (NAAQS).[2] The California Air Resources Board (CARB) subsequently established the more stringent California Ambient Air Quality Standards (CAAQS).[3] Both sets of standards are shown in Figure 4 on the following page. Areas in California where ambient air concentrations of pollutants are higher than the state standard are considered to be in *"non-attainment"* status for that pollutant.

THRESHOLDS OF SIGNIFICANCE

National Environmental Policy Act (NEPA) Thresholds

The project area resides entirely within a United States Federal Reservation under the auspices of the U.S. Bureau of Indian Affairs (BIA). The EPA is responsible for enforcing the Federal Clean Air Act of 1970 (United States Code, Title 42, Chapter 85) and subsequent amendments within all federally designated lands. The Clean Air Act (CAA) established the aforementioned NAAQS for the protection of human health and public welfare. The NAAQS represent the maximum levels of background pollution that provide an adequate margin of safety to protect the public health and welfare.

[2] Under the Federal Clean Air Act of 1970, amended in 1977.

[3] The new CARB eight-hour ozone standard became effective in early 2006. The new federal $PM_{2.5}$ standard became effective in early 2007.

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards		Federal Standards		
		Concentration	Method	Primary	Secondary	
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		–		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15.0 $\mu g/m^3$		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	–
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	Gas Phase Chemiluminescence	53 ppb (100 $\mu g/m^3$)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 $\mu g/m^3$)		100 ppb (188 $\mu g/m^3$)	None	
Sulfur Dioxide (SO_2)	24 Hour	0.04 ppm (105 $\mu g/m^3$)	Ultraviolet Fluorescence	–	–	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)[9]
	3 Hour	–		–	0.5 ppm (1300 $\mu g/m^3$)	
	1 Hour	0.25 ppm (655 $\mu g/m^3$)		75 ppb (196 $\mu g/m^3$)	–	
Lead	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	–	–	–
	Calendar Quarter	–		1.5 $\mu g/m^3$	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	–		0.15 $\mu g/m^3$		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

FIGURE 4: Ambient Air Quality Standards Matrix (after CARB/EPA, updated 9/8/10)

The CAA allows states to adopt ambient air quality standards and other regulations provided they are at least as stringent as federal standards. The California Clean Air Act of 1988 established CAAQS for criteria pollutants and additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. CARB is the state regulatory agency with authority to enforce regulations to achieve and maintain the CAAQS, except in areas where the local air quality management district has been given authority over stationary source emissions. CARB required each air basin to develop its own strategy for achieving the NAAQS and CAAQS and still maintains regulatory authority over these strategies as well as mobile source emissions statewide.

The San Diego County Air Pollution Control District (SDAPCD) is the local agency for the administration and enforcement of air quality regulations; it adopted the Regional Air Quality Strategy (RAQS) to comply with CARB requirements for developing this plan.

In 1979, the EPA required each state to prepare a State Implementation Plan (SIP), which describes how the state will achieve compliance with the NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state (including areas within the San Diego Air Basin such as the Viejas Indian Reservation) into compliance with all federal air quality standards. Every change in a compliance schedule or plan must be incorporated into the SIP. The Clean Air Act Amendments (CAAA)[4] established new deadlines for achievement of the NAAQS depending on the severity of nonattainment.

The CAAA of 1990 also mandates states to develop an operating permit program that requires all major sources of pollutants to obtain an air permit, and contains programs designed to reduce mobile source emissions, and control emissions of hazardous air pollutants through establishing control technology guidelines for various classes of sources.

Clean Air Act Conformity

On November 30, 1993, the EPA instituted final rules for determining general conformity of state and federal air quality implementation plans. In order to demonstrate conformity with the Clean Air Act, a project must clearly demonstrate that it does not:

- Cause or contribute to any new violation of any standard in any area;
- Increase the frequency or severity of any existing violation of any standard in any area; or,
- Delay timely attainment of any standard, any required interim emission reductions, or other milestones in any area.

The conformity rule applies to all actions in areas that violate one or more of the federal air quality standards (nonattainment areas). A conformity analysis is required for each of the nonattainment pollutants or its precursor emissions. The EPA has developed specific procedures for conformity determinations, which include preparing an assessment of emissions associated with the action based on the most recent emission estimates.

[4] Specifically the CAAA of 1990, et. seq.

New Source Review

A New Source Review (NSR) is required when a source has the potential to emit any pollutant regulated under the Clean Air Act in amounts equal to or exceeding the specified major source threshold (100 or 250 tons per year), which is predicated on the source's industrial category. A major modification to the source also triggers the need for an NSR.

A major modification is a physical change, or change in the method of operation, at an existing major source that causes a significant "net emission increase" at that source, of any pollutant regulated under the Clean Air Act. Any new or modified stationary emission sources require permits from the SDAPCD to construct and operate. Through the SDAPCD's permitting process, all stationary sources are reviewed and are subject to an NSR process. The NSR process ensures that factors such as the availability of emission offsets and their ability to reduce emissions are addressed and conform to the SIP.

SDAPCD Criteria Pollutant Standards

Pursuant to the California Health & Safety Code, jurisdiction for regulation of air emissions has been delegated to the San Diego County Air Pollution Control District (APCD).[5] As part of its air quality permitting process, the APCD has established thresholds for the preparation of Air Quality Impact Assessments (AQIA's) and/or Air Quality Conformity Assessments (AQCA's).

APCD Rule 20.2, which outlines these screening level criteria, states that any project that results in an emission increase equal to or greater than any of these levels, must:

> "… demonstrate through an AQIA . . . that the project will not (A) cause a violation of a State or national ambient air quality standard anywhere that does not already exceed such a standard, nor (B) cause additional violations of a national ambient air quality standard anywhere the standard is already being exceeded, nor (C) cause additional violations of a State ambient air quality standard anywhere the standard is already being exceeded, nor (D) prevent or interfere with the attainment or maintenance of any State or national ambient air quality standard."

The applicable standards are shown in Table 1 on the following page. For projects whose emissions are below these criteria, no AQIA is typically required, and project level emissions are presumed to be less than significant. The EPA accepts the

[5] Source: *California Health & Safety Code, Division 26, Part 3, Chapter 1, Section §40002.*

use of these "screening criteria" as *"Thresholds of Significance"* by projects for the purposes of environmental analysis pursuant to the CAAA.

TABLE 1: Thresholds of Significance for Air Quality Impacts

Pollutant	Thresholds of Significance (Pounds per Day)	Clean Air Act *less than significant* Levels (Tons per Year)
Carbon Monoxide (CO)	**550**	100
Oxides of Nitrogen (NO_x)	**250**	50
Oxides of Sulfur (SO_x)	**250**	100
Particulate Matter (PM_{10})	**100**	100
Particulate Matter ($PM_{2.5}$)	**55**	100
Volatile / Reactive Organic Compounds & Gasses (VOC/ROG)	**75**	50

Source: SDAPCD Rule 1501, 20.2(d)(2), 1995; EPA 40 CFR 93, 1993.

- Threshold for VOC's based on the threshold of significance for reactive organic gases (ROG's) from Chapter 6 of the CEQA Air Quality Handbook of the South Coast Air Quality Management District.
- Threshold for ROG's in the eastern portion of the County based on the threshold of significance for reactive organic gases (ROG's) from Chapter 6 of the CEQA Air Quality Handbook of the Southeast Desert Air Basin.
- Thresholds are applicable for either construction or operational phases of a project action.
- The PM2.5 threshold is based upon the proposed standard identified in the, *"Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds"*, published by SCAQMD in October 2006.

These standards are compatible with those utilized elsewhere in the State (such as South Coast Air Quality Management District standards, etc.) as part of environmental due diligence. In the event that project emissions may approach or exceed these screening level criteria, modeling would be required to demonstrate that the project's ground-level concentrations, including appropriate background levels, are below the Federal and State Ambient Air Quality Standards.

The existing site conditions are compared for the with- and without-project cases. If emissions exceed the allowable thresholds, additional analysis is conducted to determine whether the emissions would exceed an ambient air quality standard (i.e., the CAAQS values previously shown in Figure 4). Determination of significance considers both localized impacts (such as CO hotspots) and cumulative impacts. In the event that any criteria pollutant exceeds the threshold levels, the proposed action's impact on air quality is considered significant and mitigation measures would be required.

For environmental screening purposes, these screening criteria are used as numeric methods to demonstrate that a project's total emissions (e.g. stationary and fugitive emissions, as well as emissions from mobile sources) would not result in a significant impact to air quality. Since APCD does not have AQIA thresholds for emissions of volatile organic compounds (VOC's), the use of the screening level for reactive organic compounds (ROC) from the CEQA Air Quality Handbook for the South Coast Air Basin (SCAB), which has stricter standards for emissions of ROC's/VOC's than San Diego's, is appropriate. No differentiation is made between construction and operational emission thresholds by SDAPCD.

Finally, under the General Conformity Rule, the EPA has developed a set of *de minimis* thresholds for all proposed actions in a non-attainment area for evaluating the significance of air quality impacts. It should be noted that the State (i.e., SDAPCD) standards are equal to, or more stringent than, the Federal Clean Air standards.[6] Development of the proposed project would therefore fall under the stricter SDAPCD guidelines.

Combustion Toxics Risk Factors

When fuel burns in an engine, the resulting exhaust is made up of soot and gases representing hundreds of different chemical substances. The predominant constituents are:

Nitrous Oxide	Nitrogen Dioxide
Formaldehyde	Benzene
Sulfur Dioxide	Hydrogen Sulfide
Carbon Dioxide	Carbon Monoxide

Over ninety-percent (90%) of the exhaust emissions from an engine consist of soot particles whose size is equal to, or less than, 10-microns in diameter. Particles of this size can easily be inhaled and deposited in the lungs. Diesel exhaust contains roughly 20 to 100 times more emissive particles than gasoline exhaust. Of principal concern are particles of cancer causing substances known as *polynuclear aromatic hydrocarbons* (PAH's).[7]

There are inherent uncertainties in risk assessment with regard to the identification of compounds as causing cancer or other adverse health effects in humans, the cancer potencies and Reference Exposure Levels (REL's)[8] of compounds, and the exposure that individuals receive. It is common practice to use conservative (health protective) assumptions with respect to uncertain parameters. The uncertainties and conservative assumptions must be considered when evaluating the results of risk assessments.

[6] A fact that can be verified through multiplication of the SDAPCD standards by 365 days and dividing by 2,000 pounds.

[7] Polynuclear aromatic hydrocarbons (PAH's) are hydrocarbon compounds with multiple benzene rings. PAH's are a group of approximately 10,000 compounds which result predominately from the incomplete burning of carbon-containing materials like oil, wood, garbage or coal.

[8] The exposure level at which there are no biologically significant increases in the frequency or severity of adverse effects between the exposed population and the control group. Some effects may be produced at this level, but they are not considered adverse, or precursors to adverse effects.

Since the potential health effects of contaminants are commonly identified based on animal studies, there is uncertainty in the application of these findings to humans. In addition, for many compounds it is uncertain whether the health effects observed at higher exposure levels in the laboratory or in occupational settings will occur at lower environmental exposure levels. In order to ensure that potential health impacts are not underestimated, it is commonly assumed that effects seen in animals, or at high exposure levels, could potentially occur in humans following low-level environmental exposure.

Estimates of potencies and REL's are derived from experimental animal studies, or from epidemiological studies of exposed workers or other populations.[9] Uncertainty arises from the application of potency or REL values derived from this data, to the general human population. There is debate as to the appropriate levels of risk assigned to diesel particulates, since the USEPA has not yet declared diesel particulates as a toxic air contaminant.

Using the CARB threshold, a risk concentration level of one in one million (1:1,000,000) of continuous 70-year exposure is considered less than significant. A risk exposure level of ten in one million (10:1,000,000) is acceptable if Toxic Best Available Control Technologies (T-BACT's) are used. It should be noted that this type of reporting is only strictly applicable to large populations (such as entire air basins), where the sample group is sizeable, and the exposure time is long (which is not the case for project-level construction projects).

For purposes of analysis under this report, and to be consistent with the approaches used for other toxic pollutants, a functional comparison of the aforementioned risk probability per individual person exposed to construction contaminants will be examined. This approach has the advantage of not needing to quantify the population of the statistical group adjacent to the construction (which could yield false values), as well as allowing the per-person risk to be expressed as a final percentage (with a percentage level of 100% being equal to the impact threshold). Of course, for a large enough population sample (i.e., a million people or more) the results are identical to CARB's prediction methodology.

[9] Source: *CalEPA, USEPA, SCAQMD, 2001 et. seq.*

ANALYSIS METHODOLOGY

The analysis criteria for air quality impacts are based upon the approach recommended by the *South Coast Air Quality Management District's (SCAQMD) CEQA Handbook*.[10] The handbook establishes aggregate emission calculations for determining the potential significance of a proposed action. In the event that the emissions exceed the established thresholds, air dispersion modeling may be conducted to assess whether the proposed action results in an exceedance of an air quality standard. Both CARB and the EPA have approved this methodology.

Ambient Air Quality Data Collection

<u>CARB Air Monitoring Station Data within Project Vicinity</u>

The California Air Resources Board (CARB) monitors ambient air quality at approximately 250 air-monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations.

A single ambient air-quality-monitoring station is located approximately 3.7 miles from the project site (red circle) as denoted by the symbol in Figure 5a on the following page. This station (the Alpine Victoria Drive station) currently records NO_2, O_3, Outdoor Temperature, Relative Humidity, Wind Direction, and Horizontal Wind Speed. Other stations within the project vicinity present either incomplete or redundant data, or were determined not to be representative of localized ambient air quality conditions present at the project site. Periodic audits are conducted to ensure calibration conformance.[11]

<u>Onsite Air Quality Monitoring and Analysis</u>

Additionally, an ambient air quality sample was collected at the proposed hotel site at a height of 5.0-feet above ground level using a negative pressure sampling apparatus. The testing location is shown in Figures 5b on Page 15 of this report. Each air sample was collected in a 0.7-liter Teflon (Tedlar) sample bag, and sealed upon completion of the testing.

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[10] The SCAQMD CEQA Handbook is a reference volume containing an extensive list of semi-empirical (quantified experimental) curve-fit equations describing various emissive sources having important context under CEQA. The equations are not perfect (in that they would not constitute an *'exact solution'* in a scientific sense), but are nonetheless a reasonable approximation of the physical problem. In the same light, programs which utilize the SCAQMD semi-empirical methodology (such as *URBEMIS 2007* and the like) provide no greater problem understanding than using the equations directly. Such programs are still subject to all of the same limitations as the methods and equations on which they rely.

[11] Due to the type of equipment employed at each station, not every station is capable of recording the entire set of criteria pollutants. Calibration of CARB equipment is performed in accordance with the *U.S. Environmental Protection Agency's 40 CFR, Part 58, Appendix A* protocol with all equipment traceable to National Institute of Standards and Technology (NIST) standards. The typical accuracy of the equipment is ±15% for gasses (such as CO, NO_x, etc.) and ±10% for PM_{10}.

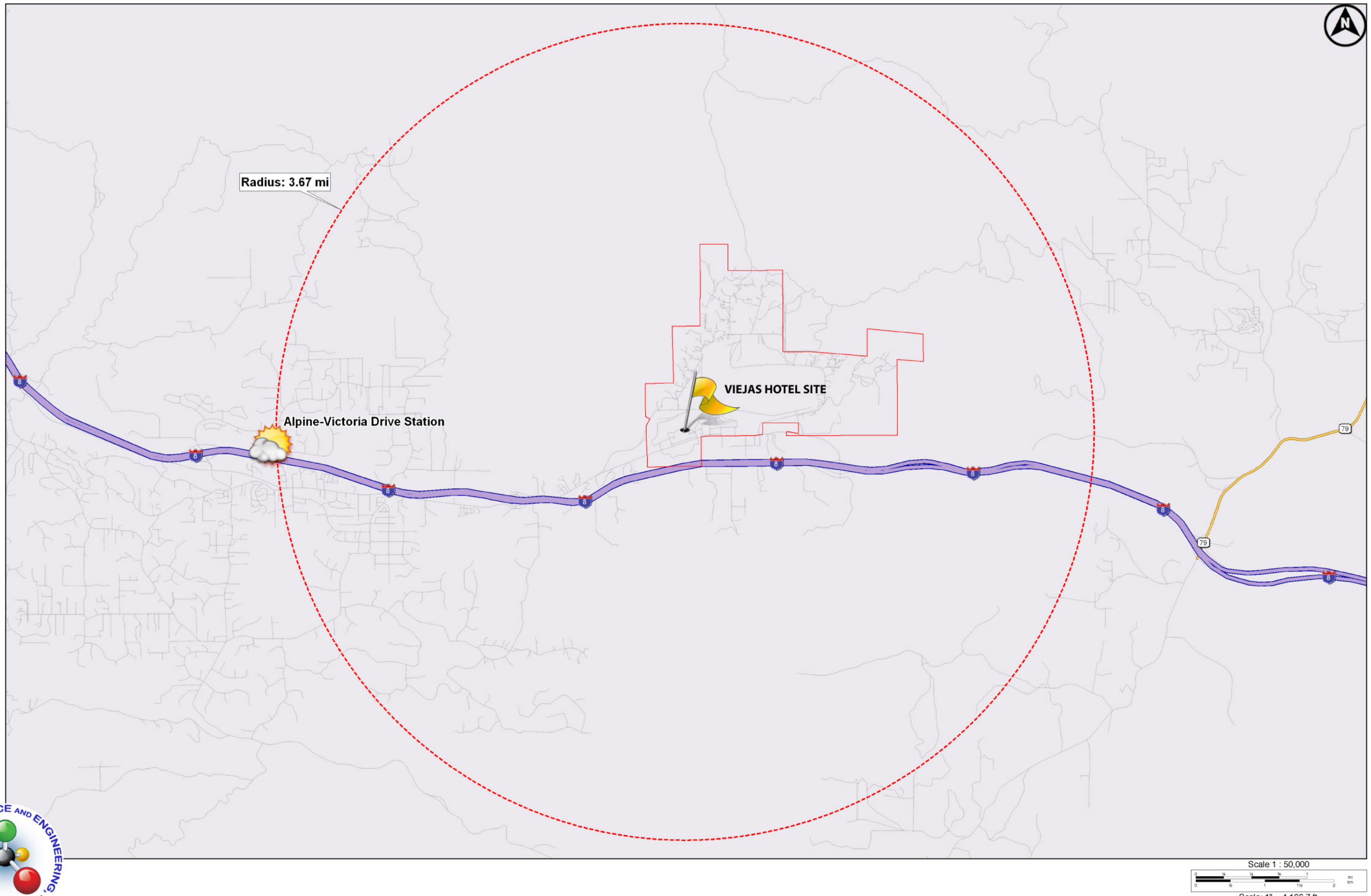

FIGURE 5a: Ambient Air Quality Monitoring Station Location Map (ISE 12/11)

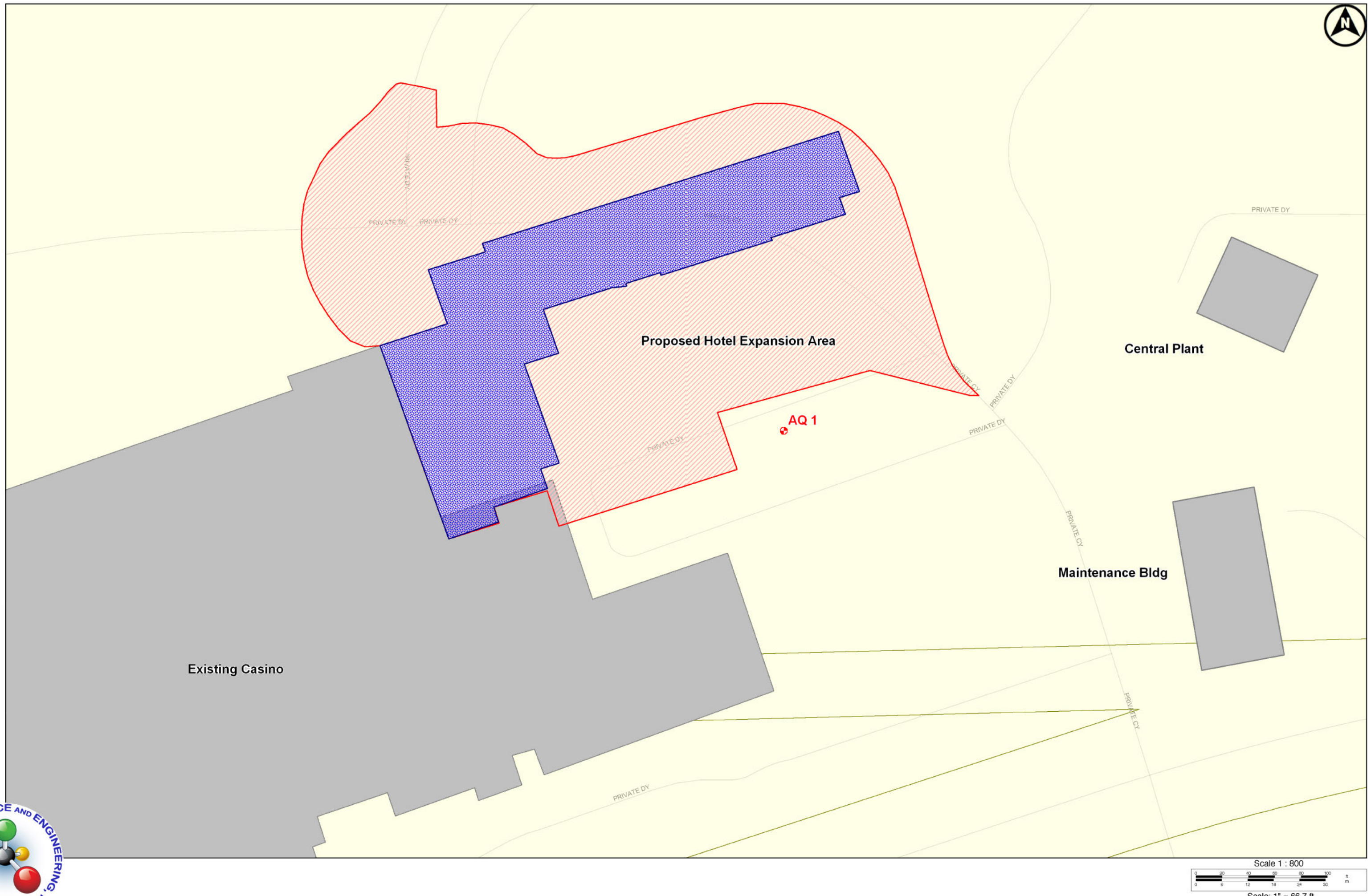

FIGURE 5b: Onsite Ambient Air Quality Sampling Location AQ 1 (ISE 12/11)

Onsite testing conditions indicated an ambient dry-bulb air temperature of 66.1 degrees Fahrenheit and a relative humidity of 33.4 percent. Wind speeds were light from the southwest, and the average barometric pressure was 28.50 in-Hg. The samples were maintained under *Standard Temperature and Pressure Conditions* (STP) during transit to the ISE test facility.

The bagged samples were tested for airborne toxics, as well as molecular composition using a Stanford Research Systems 300 atomic-mass-unit (AMU) Universal Gas Analyzer (or UGA).[12] This device, which consists of a Faraday cup quadrupole mass spectrometer, analyzes incoming gasses (or any material that can be aerosolized) for content based upon its atomic distribution. In this manner, the UGA analyzes any substance based solely upon its elemental composition. The typical test setup is shown in Figure 5c below.

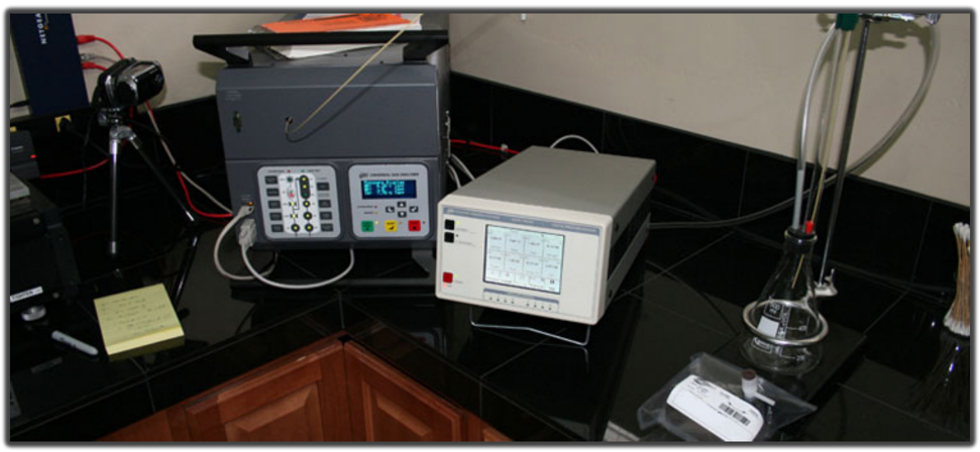

FIGURE 5c: Laboratory Mass Spectrometry Test Setup (ISE 12/11)

Data from the UGA was then post processed using a process known as *spectral deconvolution* to determine the relative composition of any toxics of interest. A final screening of the data against 191,436 different compounds was performed using the 2008 National Institute of Standards and Technology (NIST08) Mass Spectral Library search program.

Construction Air Quality Modeling

Construction Vehicle Emission Modeling (CO, NO_x, SO_x, PM_{10}, $PM_{2.5}$, ROG)

Primary construction vehicle pollutant emission generators expected within the Viejas Hotel site would consist predominately of diesel-powered grading equipment

[12] The designator AMU stands for Atomic Mass Unit, and is a measure of the atomic weight of a particular element (i.e., the combined nuclear weight of an element's protons and neutrons).

required for remedial grading activities and surface paving. The analysis methodology utilized in this report is based upon the EPA AP-42 source emissions report for the various classes of diesel construction equipment.[13]

The generation rates of typical equipment are identified in Table 2 below, and would constitute the baseline (unmitigated, or Tier 0) construction emission rates. Estimates of daily load factors (i.e., the amount of time during a day that any piece of equipment is under load) were based upon past ISE engineering experience with similar operations, and consultation with the project applicant.

TABLE 2: Baseline 'Tier 0' AP-42 Equipment Pollutant Generation Rates[14]

	Generation Rates (pounds per horsepower-hour)					
Equipment Class	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Track Backhoe	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Dozer - D8 Cat	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Hydraulic Crane	0.0090	0.0230	0.0020	0.0015	0.0014	0.0030
Loader/Grader	0.0150	0.0220	0.0020	0.0010	0.0009	0.0030
Side Boom	0.0130	0.0310	0.0020	0.0015	0.0014	0.0030
Water Truck	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Concrete Truck	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Concrete Pump	0.0110	0.0180	0.0020	0.0010	0.0009	0.0020
Dump/Haul Trucks	0.0060	0.0210	0.0020	0.0015	0.0014	0.0020
Paver / Blade	0.0070	0.0230	0.0020	0.0010	0.0009	0.0010
Roller / Compactor	0.0070	0.0200	0.0020	0.0010	0.0009	0.0020
Scraper	0.0110	0.0190	0.0020	0.0015	0.0014	0.0010

Emissions Reduction Mandates:

- The maximum CO emissions from Tier 2 equipment is 0.0082 pounds per horsepower-hour (lb/HP-hr) for equipment with power ratings between 50 and 175 HP, and 0.0057 lb/HP-hr for equipment with power ratings over 175 HP. Tier 3 ratings only apply between 50 to 750 HP and are identical to Tier 2 requirements. Tier 4 requirements (to be phased-in between 2008 and 2015) set a sliding scale on CO limits ranging from 0.0132 lb/HP-hr for small engines, to 0.0057 lb/HP-hr for engines up to 750 HP.
- The maximum NO_x and PM_{10} emissions from Tier 2 equipment are 0.0152 and 0.0003 lb/HP-hr regardless of the engine size. Tier 3 emissions must meet the Tier 2 requirement. Tier 4 standards further reduce this level to 0.0006 lb/HP-hr for NO_x, and 0.00003 lb/HP-hr for PM_{10} for engines over 75 HP.

Table data sourced U.S. EPA AP-42 "Compilation of Air Pollutant Emission Factors", 9/85 through present.

Ratings shown for full (100%) load factor.

In cases where the required construction equipment aggregate does not comply with the applicable standards for a pollutant under examination, mitigation is imposed by requiring cleaner Tier 1 through 4 equipment, as required under the Federal Clean Air

[13] This tabulation provided by the EPA is the foundation of all construction emission programs available by CARB, such as *OFFROAD* and the like. This equipment list would be classified as Tier Zero (Tier 0) equipment having none of the emissions control technologies required under the newer Tier 1 through 3 programs. This is the case for older construction equipment that is sometimes used on project sites.

[14] The $PM_{2.5}$ emission factors are based upon the SCAQMD document, *"Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds"*, 10/06. The correction factor for diesel equipment of this type is 0.920.

Act.[15,16] These maximum emission rates are shown as footnotes to Table 2 for CO, NO_x and PM_{10} for Tier 2 or better (denoted as Tier 2+) equipment.[17] Additional recommendations for *"Blue Sky Series"* equipment will be made if the applicant cannot demonstrate strict Tier 2+ compliance.[18]

Finally, fine particulate dust generation ($PM_{2.5}$) from construction equipment was analyzed using the methodology identified by the SCAQMD.[19] This approach, which utilizes the California Emission Inventory Development and Reporting System (CEIDARS) database, estimates $PM_{2.5}$ emissions as a fractional percentage of the aggregate PM_{10} emissions. For diesel construction equipment, the fractional emission factor is 0.920 $PM_{2.5}$ / PM_{10}.

Fugitive Dust Emission Modeling (PM_{10}, $PM_{2.5}$)

Fugitive dust generation from the proposed remedial grading plan was analyzed using the methodology recommended in the SCAQMD CEQA Handbook guidelines for calculating 10-micron Particulate Matter (PM_{10}) due to earthwork movement and stockpiling. The analysis assumed low-wind speeds and active wet suppression control. Aggregate levels of PM_{10}, based upon the best available surface grading estimates, were calculated in pounds per day and compared to the applicable significance criteria shown in Table 1 above. For surface grading operations, the fractional emission factor is 0.208 $PM_{2.5}$ / PM_{10} based upon the SCAQMD approach. For unpaved road travel, the fractional emission factor is 0.212 $PM_{2.5}$ / PM_{10}.

Combustion-Fired Health-Risk Emission Modeling (PM_{10}, $PM_{2.5}$)

For the purposes of this analysis, construction vehicle pollutant emission generators would consist entirely of construction activities associated with remedial grading of the proposed hotel footprint (which is the worst-case pollution emission scenario). The analysis methodology utilized in this report is based upon EPA and CARB guidelines for construction operations. Construction emissions were based upon the previously identified EPA Tier 0 through Tier 2+ generation rates for the various classes of diesel construction equipment.

---

[15] Source: *US Code of Federal Regulations, Title 40, Part 89 [40 CFR Part 89].*

[16] In most cases the federal regulations for diesel construction equipment also apply in California, whose authority to set emission standards for new diesel engines is limited. The federal Clean Air Act Amendments of 1990 (CAA) preempt California's authority to control emissions from both new farm and construction equipment under 175 hp *[CAA Section 209(e)(1)(A)]* and require California to receive authorization from the federal EPA for controls over other off-road sources *[CAA Section 209 (e)(2)(A)]*.

[17] Again, for the purposes of mitigation, any construction equipment unable to comply with the applicable standards for a specific pollutant will be reanalyzed using the applicable Tier 2 equipment for engine sizes over 50 HP. These emission rates became mandatory for all equipment built starting 2001 or later (depending on engine size).

[18] The "Blue Sky Series" designation [40 CFR Part 89] is a voluntary program enacted by the USEPA requiring participating engine manufacturers to produce cleaner burning engines that are at least 40% better than current Tier 2 or 3 mandates. Engines with this designation are assumed by the EPA to produce *de facto compliance* with current and future air quality emissions standards. This program also exists for recreational and commercial marine diesel engines [40 CFR Part 94] and land-based non-road spark-ignition engines over 25 HP [40 CFR Part1048].

[19] Specifically, the SCAQMD document entitled, *"Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds"*.

A screening risk assessment of diesel-fired toxics from construction equipment was performed using the *SCREEN3* dispersion model developed by the EPA's Office of Air Quality Planning and Standards.[20] The SCREEN3 model uses a Gaussian plume dispersion algorithm that incorporates source-related and meteorological factors to estimate pollutant concentration from continuous sources.

It is assumed that the pollutant does not undergo any chemical reactions, and that no other removal processes, such as wet or dry deposition, act on the plume during its transport from the source. Using the concentrations obtained from the screening model, the diesel toxic risk can be defined as shown below:

$$Risk = \frac{F_{\text{wind}} \times EMFAC \times URF_{\text{70 year exposure}}}{Dilution}$$

where, *Risk* is the excess cancer risk (probability in one-million);

F_{wind} is the frequency of the wind blowing from the exhaust source to the receptor (the default value is 1.0);

EMFAC is the exhaust particulate emission factor (the level from the screening model);

$URF_{70\ year\ exposure}$ is the Air Resource Board unit risk probability factor (300 x 10^{-6}, or 300 in a million cancer risk per $\mu g/m^3$ of diesel combustion generated PM_{10} inhaled in a 70-year lifetime based upon *ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics*); and,

Dilution is the atmospheric dilution ratio during source-to-receptor transport (the default value of 1.0 assumes no dilution)

Given the above assumptions for wind frequency and atmospheric dilution ratio, and substituting the CARB recommended value for the unit risk probability factor, gives the following expression:

$$Risk = \frac{1 \times EMFAC \times 300x10^{-6}}{1} = 300x10^{-6} \times EMFAC \text{ per person}$$

Thus, the percentage of risk of cancer to any given person, being exposed to a concentration of pollution equal to EMFAC (in $\mu g/m^3$) over a continuous period of 70-years, would be:

$$Risk(\%) = (300x10^{-6} \times EMFAC) \times 100 = 300x10^{-4} \times EMFAC \text{ per person}$$

Where it can be directly stated that a risk percentage of, say, 25% would indicate a 25% probability of inhaled cancer risk for the given level of exposure if consumed continuously for a period of 70-years. A 50% probability would correspond to a 50:50

[20] The methodology is based upon the *Industrial Source Complex (ISC3)* source dispersion approach as outlined in the *EPA-454/B-95-003b* technical document. The SCREEN3 model is used within the State of California and is typically more restrictive than the ISC3 model.

chance of inhaled cancer risk if consumed continuously for a period of 70-years, and so on.

For the construction-related diesel-fired toxics analysis, an area-source consistent in dimensions with the proposed grading area will be assumed. A simplified elevated terrain model (which is consistent with the area surrounding the project site) with no building downwash corrections and a worst-case wind direction was utilized.

VOC Emissions from Architectural Coatings Methodology

Volatile Organic Compound (VOC) emissions from architectural coatings such as painting will be analyzed within this report using the *SCAQMD CEQA Handbook Method A11-13* based upon an expected maximum total square-footage being painted per day. It will be assumed for the purposes of this assessment that all solvents used are water based with a maximum 50-percent by weight solids content, and are capable of generating the maximum CARB level of 250 grams of VOC per liter regardless of the application method.

Aggregate Vehicle Emission Air Quality Modeling

Motor vehicle emissions associated with proposed Viejas Hotel building project were calculated by multiplying the appropriate emission factor (in grams per mile) times the estimated trip length and the total number of vehicles. Appropriate conversion factors were then applied to provide aggregate emission units of pounds per day. CARB estimates on-road motor vehicle emissions by using a series of models called the *Motor Vehicle Emission Inventory* (MVEI) Models.

Four computer models, which form the MVEI, are *CALIMFAC, WEIGHT, EMFAC*, and *BURDEN*.[21] They function as follows:

> ***CALIMFAC*** produces base emission rates for each model year when a vehicle is new and as it accumulates mileage and the emission controls deteriorate.
>
> ***WEIGHT*** calculates the relative weighting each model year should be given in the total inventory, and each model year's accumulated mileage.
>
> ***EMFAC*** uses these pieces of information, along with the correction factors and other data, to produce fleet composite emission factors, and,
>
> ***BURDEN*** combines the emission factors with county-specific activity data to produce to emission inventories.

For the current analysis, the *EMFAC 2007 Model v2.3* of the MVEI[22] was run using input conditions specific to the San Diego County air basin to predict operational

[21] The module named *EMFAC* should not be confused with the entire EMFAC 2007 program itself (which calls the subroutines *CALIMFAC, WEIGHT, EMFAC, and BURDEN* to determine the final emission inventory for a particular area).

[22] This is the most current CARB emissions model approved for use within the State of California.

vehicle emissions from the project based upon a near term year 2012 scenario.[23] The aggregate emission factors from the CARB *EMFAC 2007* model are provided as an attachment at the end of this report. A mix ratio consistent with the Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol was used. This consisted of the following air standard Otto-Cycle engine vehicle distribution percentages:

Light Duty Autos = 69.0	Light Duty Trucks = 19.4
Medium Duty Trucks = 6.4	Heavy Duty Trucks = 4.7
Buses = 0.0	Motorcycles = 0.5

Fine particulate dust generation ($PM_{2.5}$) from motor vehicle operation was again analyzed using the CEIDARS database. For operational vehicular traffic, the fractional emission factor is 0.998 $PM_{2.5}$ / PM_{10} based upon the SCAQMD approach.

Vehicular CO / NO_x / PM_{10} / $PM_{2.5}$ Conformity Assessment

A hotspot conformity analysis was performed on all project-related roadway segments, using the *California Line Source Emissions Model Version 4* (CALINE4)[24] air dispersion model methodology in order to quantify near term cumulative plus project pollutant concentrations within this portion of the project air basin. CALINE4 is the accepted line source dispersion model within the State of California.

For the hotspot analysis, horizon traffic volumes for all affected roadway segments were used based upon near-term cumulative values provided by the project traffic engineer.[25] Worst case mean running speeds of 45 MPH and a 10% ADT level were used for all potentially impacted roadway segments utilizing the aforementioned Caltrans ITS Carbon Monoxide Protocol ratios. Worst-case wind speed, aggregate emissions class data, and meteorological assumptions were created and run for various traffic scenarios. This produced the following worst-case running emission factors, which can be seen in the last column of the EMFAC output:

CO = 2.511 grams/mile, NO_x = 0.729 grams/mile, PM_{10} = 0.023 grams/mile

Ambient CO and PM_{10} concentrations were determined through the previously discussed field monitoring effort. Levels for NO_x precursors were set to basin-wide levels. The NO_2 photolysis rate was taken at a default atmospheric solar value of 0.004/sec.[26] The CALINE4 solution space is provided as an attachment to this report.

[23] This is a worst-case assumption, since implementation of cleaner vehicle controls ultimately reduces emissions under future year conditions. By applying near-term emission factors to the complete project, an upper bound on project-related emissions is obtained.

[24] CALINE4 is a Gaussian line dispersion model, developed by Caltrans, which is used to predict localized vehicle emissions from mobile sources. The model uses source strength, meteorological data, and site geometry to predict pollutant concentrations within 1,500 feet of the roadway.

[25] Source: *Draft Traffic Impact Analysis – Viejas Hotel, LLG Engineers, Inc., 10/26/11.*

[26] Photolysis is the process by which a chemical compound undergoes a change in valence as the result of the absorption of a photon (i.e., light). This process is also called photodecomposition, photochemical reaction, or photo-oxidation.

Fixed Source Emissions Modeling

Fixed emission sources under the analysis context within this report would consist predominantly of small gasoline engines used with landscaping equipment, and emissive sources from natural gas powered appliances (such as stoves, hot water heaters, etc.) associated with the proposed utilization of the site. An analysis of these emission sources, consistent with the *SCAQMD CEQA Handbook* and current EPA protocols, will be quantified with the total aggregate emission levels identified at the end of this report.[27]

FINDINGS

Existing Climate Conditions

<u>CARB Aerometric Station Data within Project Vicinity</u>

The climate within the region surrounding the proposed Viejas Hotel site is characterized by warm, dry summers and mild, wet winters; it is dominated by a semi-permanent high-pressure cell located over the Pacific Ocean. This high-pressure cell maintains clear skies over the air basin for much of the year. It also drives the dominant onshore circulation, as can be seen in Figure 6 on the following page, and helps to create two types of temperature inversions, subsidence and radiation, that contribute to local air quality degradation.

Subsidence inversions occur during the warmer months, as descending air associated with the Pacific high-pressure cell meets cool marine air. The boundary between the two layers of air represents a temperature inversion that traps pollutants below it. Radiation inversion typically develops on winter nights, when air near the ground cools by radiation, and the air aloft remains warm. A shallow inversion layer that can trap pollutants is formed between the two layers.

In the area of the proposed project site, the maximum and minimum average temperatures are 88° F and 44° F, respectively.[28] Precipitation in the area averages 16.9 inches annually, 90 percent of which falls between November and April. Fog can occasionally develop during the winter.

[27] The analysis presented herein uses the same methodology identified in the CARB *URBEMIS* model, although providing a greater level of detail. The technical details are provided in the SCAQMD CEQA Handbook Tables A9-12 and A9-12A, -B as well as the EPA's AP-42 emission generation document previously referenced.

[28] Source: *National Weather Service (NWS) / National Oceanographic and Atmospheric Administration (NOAA), 2011.*

FIGURE 6: Project Air Basin Aerial Map (Google Earth 2011, ISE 12/11)

The prevailing wind direction at the project site is from the west-southwest, with an annual mean speed of 5 to 10 miles per hour. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of onshore sea breezes. The overall result is a noticeable degradation in local air quality.[29]

Existing Air Quality Levels

<u>CARB Aerometric Station Data within Project Vicinity</u>

Tables 3a through -d, starting below, provide a summary of the highest pollutant levels recorded at the previously identified monitoring station for the last year available (2010), based upon the latest data from the CARB Aerometric Data Analysis and Management (ADAM) System database. Given these factors, the closest monitoring station reported no air quality exceedances of State (CARB) or Federal (CAA) thresholds.[30]

TABLE 3a: San Diego Monitoring Station – Maximum Hourly NO_2 Levels

Air Resources Board

iADAM

Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

Alpine-Victoria Drive

FAQs

Year:	2008		2009		2010	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Dec 1	0.047	Oct 2	0.056	Dec 2	0.052
Second High:	Dec 30	0.046	Jan 8	0.044	Dec 14	0.044
Third High:	Dec 11	0.044	Jun 2	0.040	Dec 8	0.043
Fourth High:	Jan 11	0.042	Dec 21	0.039	Dec 10	0.042
# Days Above State Standard:		0		0		0
Annual Average:		0.008		0.008		0.007
Year Coverage:		99		93		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
National exceedances are shown in orange. State exceedances are shown in yellow.
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 12/11

[29] Occasionally during the months of October through February, offshore flow becomes a dominant factor in the regional air quality. These periods, known as “Santa Ana Conditions”, are typically maximal during the month of December with wind speeds from the north to east approaching 35 knots and gusting to over 50 knots. This air movement is caused by clockwise pressure circulation over the Great Basin (i.e., the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah), which results in significant downward air motion towards the ocean. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas and gusts greater than 100 knots in canyon areas.

[30] Monitoring for lead was discontinued entirely in 1998.

TABLE 3b: San Diego Monitoring Station – Maximum Hourly O_3 Levels

Air Resources Board

iADAM

Highest 4 Daily Maximum Hourly Ozone Measurements

Alpine-Victoria Drive

FAQs

Year:	2008		2009		2010	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Jun 20	0.139	Aug 30	0.119	Jul 15	0.105
Second High:	Jun 19	0.125	Aug 31	0.107	Jul 16	0.101
Third High:	Jul 4	0.116	Aug 29	0.104	Aug 24	0.098
Fourth High:	Jul 3	0.115	Sep 19	0.103	Aug 25	0.095
# Days Above State Standard:		13		6		4
California Designation Value:		0.12		0.11		0.11
Expected Peak Day Conc.:		0.118		0.114		0.110
# Days Above Nat'l Standard:		*2*		*0*		*0*
National Design Value:		*0.121*		*0.119*		*0.116*
Year Coverage:		99		99		99

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in parts per million.
The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics*.
State exceedances are shown in yellow. Exceedances of the revoked national 1-hour standard are shown in orange.
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 12/11

TABLE 3c: San Diego Monitoring Station – Maximum Eight-Hour O_3 Levels

Air Resources Board

iADAM

Highest 4 Daily Maximum 8-Hour Ozone Averages

Alpine-Victoria Drive

FAQs

Year:	2008		2009		2010	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jun 19	0.109	Aug 30	0.097	Aug 24	0.088
Second High:	Jul 4	0.103	Aug 31	0.094	Aug 25	0.084
Third High:	Jun 20	0.100	Sep 19	0.085	Sep 2	0.082
Fourth High:	Jul 3	0.098	Sep 27	0.085	Aug 26	0.081
California:						
First High:	Jun 19	0.110	Aug 30	0.098	Aug 24	0.088
Second High:	Jul 4	0.103	Aug 31	0.094	Aug 25	0.084
Third High:	Jun 20	0.101	Sep 19	0.085	Sep 2	0.083
Fourth High:	Jul 3	0.099	Sep 27	0.085	Aug 26	0.082
National:						
# Days Above '08 Nat'l Std.:		31		22		12
'08 Nat'l Std. Design Value:		0.092		0.089		0.088
National Year Coverage:		98		98		99
California:						
# Days Above State Standard:		61		43		20
California Designation Value:		0.103		0.098		0.096
Expected Peak Day Conc.:		0.103		0.098		0.097
California Year Coverage:		98		97		99

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
National exceedances are shown in orange. State exceedances are shown in yellow.
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 12/11

TABLE 3d: San Diego Monitoring Station – Maximum 24-Hour $PM_{2.5}$ Levels

Air Resources Board

iADAM

Highest 4 Daily 24-Hour PM2.5 Averages

Alpine-Victoria Drive

FAQs

Year:	2008		2009		2010	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:		*		*		*
Second High:		*		*		*
Third High:		*		*		*
Fourth High:		*		*		*
California:						
First High:	Jul 5	37.3	Jan 2	29.7	Jun 18	23.4
Second High:	Jul 9	31.1	Sep 6	26.2	Jul 19	23.4
Third High:	Jun 25	30.4	May 15	26.1	Jul 18	22.0
Fourth High:	Jun 27	29.6	May 14	25.1	May 7	21.7
Estimated Days > Nat'l 24-Hr Std:		*		*		*
Measured Days > Nat'l 24-Hr Std:		*		*		*
Nat'l 24-Hr Std Design Value:		*		*		*
Nat'l 24-Hr Std 98th Percentile:		*		*		*
National Annual Std Design Value:		*		*		*
National Annual Average:		*		*		*
State Ann'l Std Designation Value:		14		14		14
State Annual Average:		14.0		*		*
Year Coverage:		*		*		*

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in micrograms per cubic meter.
National exceedances are shown in orange. State exceedances are shown in yellow.
An exceedance is not necessarily a violation.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
State and national statistics may therefore be based on different samplers.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Source: CARB ADAM Ambient Air Quality Inventory – 12/11

The project site is located in the north central portion of the San Diego Air Basin. The Basin continues to have a transitional-attainment status of federal standards for Ozone (O_3) and PM_{10}. The Basin is either in attainment or unclassified for federal standards of CO, SO_2, NO_2, and lead. Factors affecting ground level pollutant concentrations include the rate at which pollutants are emitted to the atmosphere, the height from which they are released, and topographic and meteorological features.

<u>Onsite Air Pollutant Concentration Findings</u>

The atomic mass distribution of the onsite ambient air-monitoring sample is shown in Figure 7 on the following page.[31] Spectral deconvolution of the pattern shown indicated ambient air pollution concentrations, by mass percentage, as shown in Table 4 at the bottom of the following page.

[31] The plot in this figure indicates the partial atmospheric pressure (in Torr) as a function of the atomic mass unit. The larger the vertical bar, the greater the concentration of a particular atom (or diatomic form). The unit of Torr is a very small pressure unit - one atmosphere equals 760 Torr.

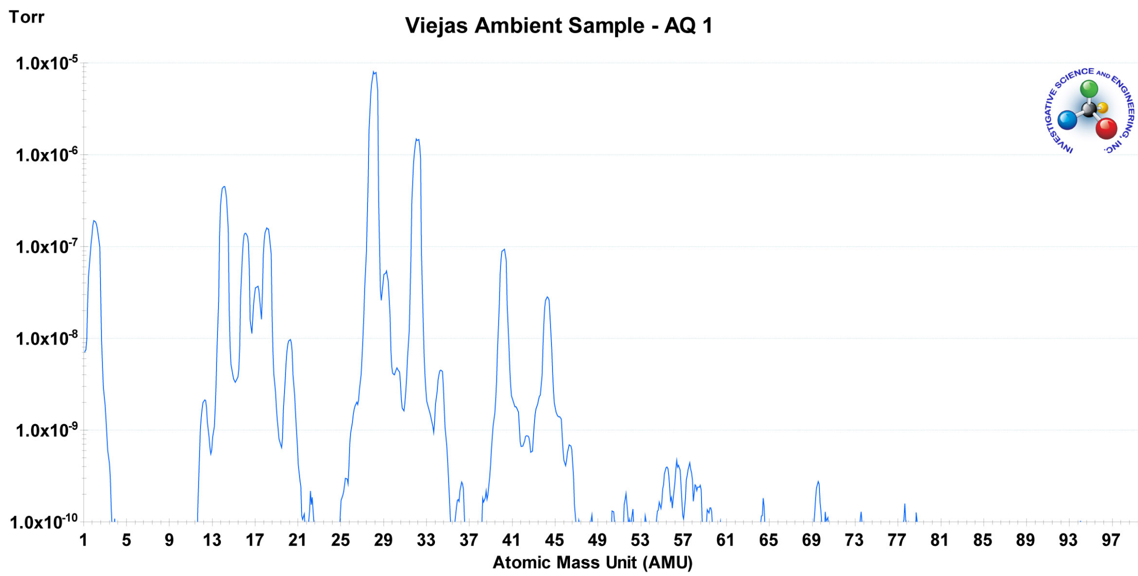

FIGURE 7: Spectral Content of Ambient Air Sample AQ 1 (ISE 12/11)

TABLE 4: Ambient Air Quality Monitoring Results

Chemical Compound Examined	Air Sample Composition (% by wt.)	
	Lab Standard Air Sample (Dry N_2 Mix)	Measured Field Sample (AQ 1)
Benzene (C_6H_6)	0.0	**0.0**
Carbon Dioxide (CO_2)	22.8	**12.7**
Carbon Monoxide (CO)	0.0	**0.0**
Hydrogen Sulfide (H_2S)	0.0	**0.0**
Free Hydrogen (H_2)	0.5	**1.5**
Nitric Oxide (NO)	7.0	**4.3**
Nitrogen Dioxide (NO_2)	0.0	**0.0**
Nitrous Oxide (N_2O)	0.0	**0.0**
Free Nitrogen (N_2)	69.1	**68.5**
Free Oxygen (O_2)	0.3	**11.5**
Sulfur Dioxide (SO_2)	0.0	**0.0**
Water Vapor (H_2O)	0.2	**1.5**

Partial Pressure Mass Fractions by Percent. Data Margin ± 0.1 percent.

Given these findings, no significant ambient air quality impacts are indicated. No respirable 10- and 2.5-micron particulate matter (PM_{10} and $PM_{2.5}$) was indicated in the sample. Toxicity screening against the NIST spectral database indicated no unusual compounds present.

Project Construction Emission Findings

The proposed Viejas Hotel project site would be cleared and remedially graded over the course of approximately 60 days per construction earthwork phase.[32] Given this, the following construction findings were indicated.

Construction Vehicle Emissions (CO, NO_x, SO_x, PM_{10}, $PM_{2.5}$, ROG)

The estimated Tier 0 diesel exhaust emissions are provided in Table 5a, below, for the site clearing and remedial grading, inclusive of any onsite powered haulage. Based upon the findings, no significant air quality impacts are expected due to construction grading operations.

TABLE 5a: Predicted Construction Emissions – Remedial Grading / Clearing / Hauling

					Aggregate Emissions in Pounds / Day					
Equipment Type	Qty. Used	HP	Daily Load Factor (%)	Duty Cycle (Hrs. / day)	CO	NOx	SOx	PM_{10}	$PM_{2.5}$	ROG
Dozer - D8 Cat	1	300	50	8	10.8	27.6	2.4	1.8	1.7	3.6
Loader	1	150	50	8	9.0	13.2	1.2	0.6	0.6	1.8
Water Truck	1	200	50	4	2.4	8.4	0.8	0.6	0.6	0.8
Dump/Haul Trucks	2	300	20	4	2.9	10.1	1.0	0.7	0.6	1.0
Total for this Construction Task (Σ):					**25.1**	**59.3**	**5.4**	**3.7**	**3.5**	**7.2**
Significance Threshold (SDAPCD):					**550**	**250**	**250**	**100**	**55**	**75**

Additionally, Table 5b, on the following page, identifies the anticipated emissions due to underground utility construction and ancillary surface paving activities for any phase of construction. As can be seen, no significant impact is expected from these smaller operations using the baseline Tier 0 emissions inventory.

[32] The typical construction phases for land development, which are independent of the specific project being developed, are as follows:

Construction Phase	Work Performed	Typical Tasks
Rough Grading	Site clearing, grubbing, and general pad and road alignment formation.	Site mobilization, scraper hauls/finishing, and additional site finishing work.
Underground Utility Construction	General trench-work, pipe laying with associated base material and cover, and ancillary earthwork required to facilitate placement of sewer lift stations, manholes, etc.	This is typically performed as a single task.
Paving Activities	Movement of any remaining material as well as necessary curb and gutter work, road base material placement and blacktop.	This is typically performed as a single task.

TABLE 5b: Predicted Construction Emissions – Underground Utilities / Paving

					Aggregate Emissions in Pounds / Day					
Equipment Type	**Qty. Used**	**HP**	**Daily Load Factor (%)**	**Duty Cycle (Hrs. / day)**	**CO**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Underground Utility Construction										
Track Backhoe	1	150	50	6	6.8	9.9	0.9	0.5	0.5	1.4
Loader	1	150	50	6	6.8	9.9	0.9	0.5	0.5	1.4
Concrete Truck	2	250	25	0.5	0.4	1.3	0.1	0.1	0.1	0.1
Dump/Haul Trucks	2	300	45	4	6.5	22.7	2.2	1.6	1.5	2.2
Total for this Construction Task (Σ):					**20.5**	**43.8**	**4.1**	**2.7**	**2.6**	**5.1**
Surface Paving Activities										
Skid Steer Cat	1	150	50	6	6.8	9.9	0.9	0.5	0.5	1.4
Dump/Haul Trucks	4	300	45	0.5	1.6	5.7	0.5	0.4	0.4	0.5
Paver	1	150	35	8	2.9	9.7	0.8	0.4	0.4	0.4
Roller	1	150	35	8	2.9	8.4	0.8	0.4	0.4	0.8
Total for this Construction Task (Σ):					**14.2**	**33.7**	**3.0**	**1.7**	**1.7**	**3.1**
Significance Threshold (SDAPCD):					**550**	**250**	**250**	**100**	**55**	**75**

Fugitive Dust Emission Levels (PM_{10}, $PM_{2.5}$)

Construction activities are also a source of fugitive dust emissions that may have a substantial, but temporary, impact on local air quality. These emissions are typically associated with land clearing, excavating, and construction of a proposed action. Substantial dust emissions also occur when vehicles travel on paved and unpaved surfaces, and haul trucks lose material.

Dust emissions and impacts vary substantially from day to day, depending on the level of activity, the specific operation being conducted, and the prevailing meteorological conditions. Wet dust suppression techniques, such as watering and/or applying chemical stabilization, would be used during construction to suppress the fine dust particulates from leaving the ground surface and becoming airborne through the action of mechanical disturbance or wind motion.

Remedial grading operations at the proposed Viejas Hotel site are anticipated as being no greater than a worst-case 10,000 cubic-yards (cy) of fill material moved over an anticipated initial 60-day earthwork period. For alluvium-type material, the project earthwork would have a total working weight of,

$$\text{Working Weight} = 10{,}000 \text{ cubic yards} \times \frac{1.3 \text{ tons}}{\text{cubic yard}} = 13{,}000 \text{ tons}$$

Out of the total quantity identified above, it is estimated that roughly 80-percent of the working weight would be capable of generating PM_{10}. Thus, for the purposes of analysis, the working weight of earthwork material capable of generating some amount of PM_{10} would be 10,400 tons. Thus, the average mass grading earthwork fill movement per day over the total 60 working days would be 173.3 tons/day.

Following the analysis procedure identified in the *SCAQMD CEQA Handbook* for PM_{10} emissions from fugitive dust gives the following semi-empirical relationship for aggregate respirable dust generation,

$$PM_{10} = 0.00112 \times \left[\frac{\left(\frac{WS}{5} \right)^{1.3}}{\left(\frac{SMC}{2} \right)^{1.4}} \right] \times ET$$

where, PM_{10} = Fugitive dust emissions in pounds,
WS = Ambient wind speed,
SMC = Surface Moisture Content, generally defined as the weight of the water (W_w) divided by the weight of the soil (W_s) as measured at the surface in grams per gram.
ET = Earthwork Tonnage moved per day,

Substituting a minimum SMC value of 0.25 (which is extremely conservative for an ambient dirt/sand condition), and a maximum credible wind speed scenario of 12 MPH (WS = 12), gives the following result,

$$\mathrm{PM}_{10} = 0.00112 \times \left[\frac{\left(\frac{12}{5} \right)^{1.3}}{\left(\frac{0.25}{2} \right)^{1.4}} \right] \times 173.3 = 11.1$$

or, a level of 11.1 pounds of PM_{10} generated per day. It should be noted that surface wetting will be utilized during all phases of earthwork operations at a minimum level of three times per day; thus a control efficiency of 34% to 68% reduction in fugitive dust can be applied per the SCAQMD methodology.

Assuming a median 60% control efficiency, due to the aforementioned watering yields,

$$\mathrm{PM}_{10} = (1 - 0.6) \times 11.1 = 4.5$$

or a total fugitive dust generated load of 4.5 pounds per day. This level is far below the 100 pounds per day threshold established by the SDAPCD. Therefore, no impacts are expected from this phase of construction. The commensurate $PM_{2.5}$ level would be 0.9 pounds per day, which is also below the proposed threshold of significance of 55 pounds per day for this pollutant.

Additionally, following the analysis methods identified in the *SCAQMD CEQA Handbook* for PM_{10} emissions due to unpaved haul roads gives the following semi-empirical relationship for aggregate respirable dust generation,

$$PM_{10} = VMT \times \left[2.1 \left(\frac{SLP}{12} \right) \left(\frac{MVS}{30} \right) \left(\frac{MVW}{3} \right)^{0.7} \left(\frac{NW}{4} \right)^{0.5} \left(\frac{365 - RD}{365} \right) \right]$$

where, PM_{10} = Fugitive dust emissions in pounds due to haulage on unpaved roads,
VMT = Vehicle Miles Traveled per day,
SLP = Soil Silt Loading in Percent,
MVS = Mean Vehicle Speed in miles per hour,
MVW = Mean Vehicle Weight in tons,
NW = Number of Wheels on the vehicle,
RD = Mean number of Rain Days with at least 0.01 inches of precipitation

Unpaved road travel due to construction activities is also unknown at this time. For the purposes of analysis, it will be assumed that contractors' vehicles moving onsite would traverse a total of 10 miles per day (VMT) during the earthwork and site preparation phases moving fill material from an onsite borrow-pit area.

Substituting the applicable project values of VMT = 10, SLP = 6.0 (sand/gravel road with watering), MVS = 5 miles per hour, MVW = 20 tons (gross vehicular weight), NW = 10 wheels (average number of wheels), and RD[33] = 44.0 (rain days), gives the following result,

$$\mathrm{PM}_{10} = 10.0 \times \left[2.1 \left(\frac{6}{12} \right) \left(\frac{5}{30} \right) \left(\frac{20}{3} \right)^{0.7} \left(\frac{10}{4} \right)^{0.5} \left(\frac{365 - 44}{365} \right) \right] = 9.2$$

or, a level of 9.2 pounds of PM_{10} generated per day. This activity alone would not generate a significant impact. The commensurate $PM_{2.5}$ level would be 1.9 pounds per day, which is also below the proposed threshold of significance identified above.

<u>Combustion-Fired Health-Risk Emission Levels (PM_{10}, $PM_{2.5}$)</u>

Onsite construction equipment was found to generate worst-case daily pollutant levels during the rough grading phase. These emissions are assumed to occur over any given 24-hour day (thereby providing an upper bound on expected emission concentrations) and direct comparison with CAAQS standards. Although all stable

[33] Based upon U.S. Weather Service average precipitation year data for San Diego County.

criteria pollutants are provided, it should be noted that for cancer-risk potential, only combustion-fired PM_{10} particulates are considered with $PM_{2.5}$ concentrations being determined through the aforementioned fractional emission estimates.

The proposed Viejas Hotel project site has a maximum working footprint of roughly 115,580 square-feet (10,738 m^2) based upon data obtained from the project site plans. The aggregate Tier 0 mitigated emission rates for the various criteria pollutants, in grams per second, and grams per square-meter (m^2) per second, are shown in Table 6 below.[34] The expected combustion-fired construction emission concentrations from the *SCREEN3* modeling are shown in Table 7 at the top of the following page. The output model results are provided as an attachment to this report.

TABLE 6: Predicted Onsite Diesel-Fired Construction Emission Rates (Tier 0)

Criteria Pollutant	Max Daily Emissions (pounds)	Daily Site Emission Rates (grams/second)	Average Area Emission Rates (grams/m^2/second)
CO	25.1	0.1318	1.2272E-05
NO_x	59.3	0.3113	2.8993E-05
SO_x	5.4	0.0283	2.6402E-06
PM_{10}	**3.7**	**0.0194**	**1.8090E-06**
$PM_{2.5}$	3.5	0.0184	1.7112E-06

Total averaging time is 24 hours x 60 minutes/hour x 60 seconds/minute = 86,400 seconds per CAAQS standards.

The area emission rates are shown in scientific notation and are expressed in the form of *mantissa-exponent* to base 10.

One pound-mass = 453.592 grams.

Based upon the model results, all criteria pollutants were below the recommended health risk level with a PM_{10} risk probability of 0.311% per 70-year exposure duration, assuming the implementation of T-BACT. Given this, no significant carcinogenic impact potential is expected due to proposed grading operations. Additionally, the analysis identified a worst-case PM_{10} level of 10.4 $\mu g/m^3$ occurring at a distance of 291 meters (954 feet) from the project site. This pollutant concentration is below the California Ambient Air Quality Standard (CAAQS) of 50 $\mu g/m^3$ established by the State for any given 24-hour exposure period. This predicted diesel-fired PM_{10} dispersion pattern as a function of distance from the site can be seen in Figure 8 on the following page. No cumulative contribution from the site would be physically possible beyond the extents identified in this figure.[35]

[34] As a required input parameter for the SCREEN3 model.

[35] Which, assuming a standard Gaussian distribution, would yield an effective no impact distance of 3,816 feet (or 0.72 miles).

TABLE 7: SCREEN3 Predicted Diesel-Fired Emission Concentrations

Criteria Pollutant	Pollutant Concentration ($\mu g/m^3$)	Pollutant Concentration (ppm)	Pollutant Risk Probability (percent risk per person for 70-year exposure)	Significant?
CO	70.18	0.0610	n/a	No
NO_x	165.80	0.0882	n/a	No
SO_x	15.10	0.0058	n/a	No
PM_{10}	**10.35**	**- -**	**0.311%**	No
$PM_{2.5}$	9.52	- -	n/a	No

Diesel risk calculation based upon ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics inhaled in a 70-year lifetime.

Conversion Factors (approximate):

CO: 1 ppm = 1,150 $\mu g/m^3$ @ 25 deg-C STP, NO_x: 1 ppm = 1,880 $\mu g/m^3$ @ 25 deg-C STP
SO_x: 1 ppm = 2,620 $\mu g/m^3$ @ 25 deg-C STP, PM_{10} and $PM_{2.5}$: 1 ppm = 1 g/m^3 (solid)

$PM_{2.5}$ levels based upon the CEIDARS database fractional emission factor for diesel construction equipment of 0.920 $PM_{2.5}$ / PM_{10}.

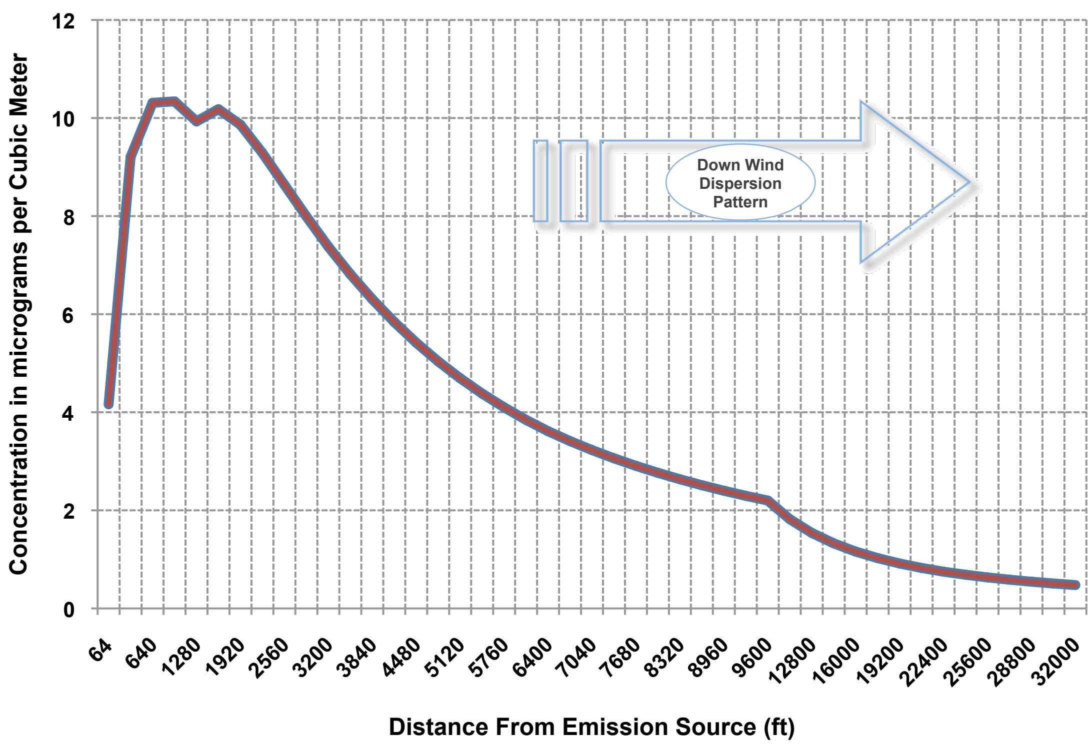

FIGURE 8: Predicted Combustion-Fired Diesel PM_{10} Dispersion Pattern (ISE 12/11)

Finally, anticipated diesel-fired $PM_{2.5}$ levels would not be expected to exceed 9.5 $\mu g/m^3$, which is also below the Federal NAAQS 24-hour threshold of 35 $\mu g/m^3$ (there are no State thresholds for this pollutant). No cumulative contribution of $PM_{2.5}$ from the site would be physically possible due to the reasons cited above.

VOC Emission Potential from Architectural Coatings

Following the analysis methods identified in the *SCAQMD CEQA Handbook* for Volatile Organic Compound (VOC) emissions due to architectural coatings gives the following semi-empirical relationship for aggregate emission levels,

$$\mathrm{VOC}_{\mathrm{arch}} = \left[\frac{WT \times A}{1000}\right] \times CT$$

where, VOC = Total pounds of Volatile Reactive Organic Compounds per day,
WT = Specific VOC weight in pounds per mil per 1,000 square-foot application area,
A = Total exterior and/or interior area to be coated in square-feet,
CT = Required paint thickness in mils.

Due to the nature of the project design at this point, exact painting quantities are unknown. It is expected that the proposed Viejas Hotel contractors could completely finish paint[36] a maximum of 5,000 square-feet (denoted as A) of usable surface area every day (denoted as ΔT).

This yields the following modified expression:

$$\mathrm{VOC}_{\mathrm{arch}} = \left[\frac{\frac{WT}{\Delta T} \times A}{1000}\right] \times CT$$

Substituting the applicable unmitigated project values of WT = 7.12 pounds of VOC per 1,000 square-feet of painted area (per SCAQMD Table A11-13-C), ΔT = 1 day, A = 5,000 square-feet, CT = 2.0 mils (as the default value for two fast passes using an HVLP[37]) gives the following result,

$$\mathrm{VOC}_{\mathrm{arch}} = \left[\frac{7.12 \times 5000}{1000 \times 1}\right] \times 2.0 = 71.2$$

[36] Finish painting implies, in the context of this report, complete surface area painting consisting of two coats as well as any required trim work. The referenced square-footage is the floor area square-footage per SCAQMD.

[37] HVLP = High-Volume, Low-Pressure painting system.

or, a total unmitigated architectural generated VOC level of 71.2 pounds per day. It can be shown that the VOC load can be reduced by a factor of 2.56 / 7.12 = 0.36 through the application of Low VOC paints.[38] This would produce final VOC levels of 0.36 x 71.2 = 25.6 pounds of VOC per day. No remedial impacts would be expected.

Odor Impact Potential from Proposed Site

The inhalation of VOC's causes smell sensations in humans. These odors can affect human health in four primary ways:

- The VOC's can produce toxicological effects;
- The odorant compounds can cause irritations in the eye, nose, and throat;
- The VOC's can stimulate sensory nerves that can cause potentially harmful health effects; and,
- The exposure to perceived unpleasant odors can stimulate negative cognitive and emotional responses based on previous experiences with such odors.

Development of the proposed project site could generate trace amounts (less than 1 $\mu g/m^3$) of substances such as ammonia, carbon dioxide, hydrogen sulfide, methane, dust, organic dust, and endotoxins (i.e., bacteria are present in the dust). Additionally, proposed onsite uses could generate substances such as volatile organic acids, alcohols, aldehydes, amines, fixed gases, carbonyls, esters, sulfides, disulfides, mercaptans, and nitrogen heterocycles.

It should be noted that odor generation impacts due to the project are not expected to be significant, since any odor generation would be intermittent and would terminate upon completion of the construction phase of the project. Further, there are no known modifications to the existing reservation wastewater treatment plant (WWTP) planned as part of the project. As a result, no significant air quality impacts are expected to surrounding residential receptors. No mitigation for odors is identified.

Project Vehicular Emission Levels

The Viejas Hotel building project is expected to have a worst-case trip generation level of 450 ADT based upon the cumulative trip generation produced for the proposed project.[39,40] The <u>average</u> one-way trip length would be 25.0 miles given the average service radius of the proposed facility.[41] A median speed of 45 MPH was used, consistent with average values observed (i.e., combined highway and surface street

[38] SCAQMD CEQA Handbook Table A11-13-C.

[39] Source: *Draft Traffic Impact Analysis – Viejas Hotel, LLG Engineers, Inc., 10/26/11.*

[40] Motor vehicles are the primary source of emissions associated with the proposed project area. Typically, uses such as the proposed project <u>do not directly emit</u> significant amounts of air pollutants from onsite activities. Rather, vehicular trips to and from these land uses are the significant contributor.

[41] The average assumed trip length is the average travel distance to or from the site. It is anticipated that some end trips will be shorter, and some longer, but for the purposes of analysis, the average value is given.

traffic activity). The calculated daily emission levels due to travel to and from the site are shown in Table 8 below for the aggregate project trip generation. Based upon the findings, no significant impacts for any criteria pollutants were identified.

TABLE 8: Operational Trip Emissions – Viejas Hotel Building Project

		Aggregate Trip Emissions in Pounds / Day					
Development Phase	**ADT**	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
EMFAC 2007 Year 2012 Emission Rates (in grams/mile @ 45 MPH)							
Light Duty Autos (LDA)		1.937	0.253	0.003	0.008	0.008	0.055
Light Duty Trucks (LDT)		2.416	0.391	0.003	0.017	0.017	0.057
Medium Duty Trucks (MDT)		2.662	0.796	0.005	0.018	0.018	0.087
Heavy Duty Trucks (HDT)		3.750	8.884	0.013	0.270	0.269	0.402
Buses (UBUS)		3.471	15.139	0.021	0.149	0.149	0.468
Motorcycles (MCY)		29.672	1.504	0.002	0.024	0.024	2.642
Proposed Project Action @ 450 Net ADT							
Light Duty Autos (LDA):	311	33.15	4.33	0.05	0.14	0.1	0.94
Light Duty Trucks (LDT):	87	11.62	1.88	0.01	0.08	0.1	0.27
Medium Duty Trucks (MDT):	29	4.23	1.26	0.01	0.03	0.0	0.14
Heavy Duty Trucks (HDT):	21	4.37	10.36	0.02	0.31	0.3	0.47
Buses (UBUS):	0	0.00	0.00	0.00	0.00	0.0	0.00
Motorcycles (MCY):	2	3.68	0.19	0.00	0.00	0.0	0.33
Total:	**450**	**57.0**	**18.0**	**0.1**	**0.6**	**0.6**	**2.1**
Significance Threshold (SDAPCD):		**550**	**250**	**250**	**100**	**55**	**75**

Assumes:
Average 25.0-mile trip distance per vehicle (Proposed Project).
San Diego air basin wintertime conditions (50° F).[42]
For operational traffic, the fractional emission factor is 0.998 $PM_{2.5}$ / PM_{10}.

Predicted CO / NO_x / PM_{10} / $PM_{2.5}$ Concentration Levels

Table 9 on the following page lists the roadway segments identified by the traffic engineer for the cumulative build out plus project scenario, the predicted peak hour traffic volume, and the expected CO, NO_x, PM_{10}, and $PM_{2.5}$ emissions at 100 feet from the road centerline (minimum possible standing receptor distance). Based upon the dispersion model findings, no localized criteria pollutant impacts were identified for any roadway segment examined. The roadway segments examined were found to comply with the CAAQS and NAAQS standards.

[42] Which is the condition whereby pollutant concentrations have the highest persistence and thus are most likely to produce an impact.

TABLE 9: Existing Segment Incremental Project Increases for CO, NO_X, PM_{10} and $PM_{2.5}$

Roadway	Segment	LOS	ADT	Δ CO (ppm)	Δ NO_X (pphm)	Δ PM_{10} (ppm)	Δ $PM_{2.5}$ (ppm)
Near Term Cumulative Conditions (Weekday)							
Willow Road	West of Viejas Casino Entrance	D	8,190	0.1	0.9	1.1	1.1
	East of Viejas Casino Entrance	B	2,530	0.1	0.7	0.6	0.6
Near Term Cumulative Conditions (Weekend)							
Willow Road	West of Viejas Casino Entrance	E	12,270	0.1	1.1	1.5	1.5
	East of Viejas Casino Entrance	B	2,820	0.1	0.7	0.6	0.6

Predicted Operational Emission Levels

As previously discussed, fixed emission sources under this context would consist entirely of small gasoline engines used with lawn mowers and landscaping equipment as well as emissive sources from natural gas powered appliances (such as hot water heaters, stoves, etc.). Each of these sources is discussed in detail below.

Small Gasoline Engine Emission Sources

Landscaping equipment utilized in the course of maintenance of the Viejas Hotel project site typically would consist of a five horsepower four-stroke lawnmower and a small weed trimmer having a two-stroke engine with approximately 30 to 50 cubic-centimeters of displacement.[43]

For the purposes of analysis, the proposed hotel structure will be treated as a {CARB-classified} multifamily residential space consisting of an aggregate of approximately 156 use spaces distributed across a single building.

This equates to the following fixed emission levels in pounds per day for the aggregate of the proposed project development plan:

Land Use Type	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	ROG (lb/day)
Multifamily Use	43.1	0.8	0.0	0.1	4.9

These sources would be classified as insignificant emission sources and would not generate an air quality impact.

[43] Assuming cleaner burning engines purchased new from the store by the ultimate user, the following emissions rates (in pounds per day per unit) are projected by CARB:

Pollutant	Single-Family Emissions Per Unit	Multi-Family/Retail Emissions Per Unit
CO	0.00576	0.276
NO_x	0.00014	0.005
SO_x	0.0002	0.0001
PM_{10}	0.000005	0.00037
ROG	0.00054	0.0315

It should be noted that these emission factors are also the identical emission factors utilized by the URBEMIS model.

Natural Gas Emission Sources

Natural gas consumption (typically due to usage of central heating units and water heaters) would produce the following approximate total pounds of combustion emissions:

$$\mathrm{CP}_{\mathrm{combustion}} = ER \times \left[\frac{NU \times UR}{30} \right] \times 1\mathrm{x}10^{-6}$$

where, CP = The criteria pollutant under examination (i.e., CO, NO_x, PM_{10}, or ROG)

ER = Emissions rate of criteria pollutant per million-cubic-feet of natural gas consumed.

CO = 40 pounds/MM Cubic-feet

NO_x = 94 pounds/MM Cubic-feet

PM_{10} = 0.18 pounds/MM Cubic-feet

ROG = 7.26 pounds/MM Cubic-feet

NU = Total number of units per land use type (i.e., residential/commercial),

UR = Specific natural gas usage rate per development type (Single-Family = 6,665 ft^3/month, Multi-family = 4,011.5 ft^3/month, Retail Space = 2.9 ft^3/SF/month)

As before, the proposed Viejas Hotel area will be treated as a multifamily residential space consisting of an aggregate of approximately 156 use spaces distributed across a single building. This equates to the following fixed emission levels in pounds per day for the aggregate of the proposed development plan:

Land Use Type	CO (lb/day)	NO_x (lb/day)	PM_{10} (lb/day)	ROG (lb/day)
Multifamily Use	0.8	2.0	0.0	0.2

These sources would be classified as insignificant emission sources and would not generate an air quality impact.

CONCLUSIONS AND RECOMMENDATIONS

Aggregate Project Emissions

The aggregate emission levels produced by the proposed Viejas Hotel plan are shown in Table 10 below. Based upon the findings, no construction or operational air quality impacts are anticipated during either the construction or operational phases of the project.

TABLE 10: Aggregate Emissions Synopsis – Viejas Hotel Building Project

	Aggregate Emissions in Pounds / Day					
SCENARIO EXAMINED	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**[44]	**ROG / VOC**
Construction Grading Operations						
Grading Emissions (Tier 0 Baseline):	25.1	59.3	5.4	3.7	3.5	7.2
Surface Grading Dust Generation:	- -	- -	- -	4.5	0.9	- -
Powered Haulage Dust Generation:	0.0	0.0	0.0	9.2	1.9	0.0
Total (Σ):	**25.1**	**59.3**	**5.4**	**17.3**	**6.4**	**7.2**
Construction Building Operations						
Architectural Coating Application:						71.2
Unmitigated Total (Σ):	- -	- -	- -	- -	- -	**71.2**
With Low VOC Paint Application (Σ):	- -	- -	- -	- -	- -	**25.6**
Project Operations						
Vehicular Traffic Generation:	57.0	18.0	0.1	0.6	0.6	2.1
Fixed Source #1 (Small Engine – MF Residential):	43.1	0.8	0.0	0.1	- -	4.9
Fixed Source #2 (Natural Gas – MF Residential):	0.8	2.0	- -	0.0	- -	0.2
Total (Σ):	**100.9**	**20.8**	**0.1**	**0.6**	**0.6**	**7.2**
Significance Threshold (SDAPCD):	**550**	**250**	**250**	**100**	**55**	**75**

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[44] Values shown in this column are for informational purposes only. $PM_{2.5}$ emissions are not currently regulated by CARB. The 55 pound-per-day level shown is a proposed standard that has not been adopted.

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE), located at 1134 D Street, Ramona, CA 92065. The members of its professional staff contributing to the report are listed below:

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ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810. Original reports contain a non-photo blue ISE watermark at the bottom of each page.

Approved as to Form and Content:

Rick Tavares, Ph.D.

Project Principal
Investigative Science and Engineering, Inc. (ISE)

APPENDICES / SUPPLEMENTAL INFORMATION

EMFAC 2007 EMISSION FACTOR TABULATIONS – SCENARIO YEAR 2012

```
Title     : San Diego County Subarea Winter CYr 2012
Version   : Emfac2007 V2.3 Nov 1 2006
Run Date  : 2010/10/19 12:15:09
Scen Year: 2012 -- All model years in the range 1968 to 2012 selected
Season    : Winter
Area      : San Diego
*****************************************************************************************
     Year: 2012 -- Model Years 1968 to 2012 Inclusive -- Winter
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

     County Average                          San Diego              County Average

                        Table   1:  Running Exhaust Emissions (grams/mile)

     Pollutant Name: Reactive Org Gases       Temperature:  50F  Relative Humidity:  40%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.244	0.248	0.405	3.008	1.936	4.215	0.410
15	0.167	0.172	0.281	1.589	1.409	3.405	0.269
20	0.121	0.125	0.205	0.947	1.066	2.888	0.191
25	0.093	0.097	0.157	0.758	0.839	2.571	0.151
30	0.075	0.079	0.126	0.615	0.685	2.405	0.125
35	0.064	0.067	0.106	0.512	0.582	2.363	0.109
40	0.058	0.060	0.094	0.442	0.512	2.438	0.100
45	0.055	0.057	0.087	0.402	0.468	2.642	0.097
50	0.054	0.057	0.085	0.391	0.445	3.004	0.099
55	0.057	0.059	0.087	0.406	0.438	3.583	0.108
60	0.063	0.065	0.094	0.448	0.447	4.481	0.123
65	0.074	0.076	0.107	0.516	0.474	5.873	0.149

```
     Pollutant Name: Carbon Monoxide          Temperature:  50F  Relative Humidity:  40%
```

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	3.598	4.554	5.645	13.849	14.475	29.624	4.815
15	3.178	4.001	4.703	9.760	9.927	25.803	4.109
20	2.848	3.570	4.045	7.282	7.214	23.516	3.600
25	2.582	3.227	3.569	5.915	5.555	22.418	3.231
30	2.366	2.950	3.219	4.977	4.531	22.369	2.951
35	2.190	2.728	2.961	4.345	3.915	23.393	2.742
40	2.048	2.551	2.779	3.947	3.582	25.686	2.596
45	1.937	2.416	2.662	3.750	3.471	29.672	2.511
50	1.858	2.322	2.612	3.741	3.562	36.126	2.493
55	1.814	2.273	2.637	3.931	3.870	46.424	2.559
60	1.811	2.278	2.757	4.354	4.452	63.014	2.742
65	1.866	2.355	3.014	5.078	5.423	90.365	3.105

Pollutant Name: Oxides of Nitrogen Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.391	0.616	1.095	15.228	23.752	1.320	1.162
15	0.348	0.542	0.973	11.723	19.230	1.321	0.960
20	0.316	0.488	0.888	10.139	16.369	1.333	0.851
25	0.292	0.448	0.831	9.557	14.638	1.353	0.795
30	0.274	0.420	0.795	9.148	13.742	1.381	0.756
35	0.263	0.402	0.779	8.899	13.534	1.415	0.733
40	0.256	0.392	0.779	8.809	13.978	1.456	0.724
45	0.253	0.391	0.796	8.884	15.139	1.504	0.729
50	0.255	0.397	0.833	9.140	17.200	1.558	0.750
55	0.262	0.411	0.891	9.610	20.512	1.618	0.788
60	0.273	0.435	0.977	10.343	25.694	1.687	0.848
65	0.290	0.471	1.102	11.419	33.832	1.765	0.938

Pollutant Name: Sulfur Dioxide Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.007	0.009	0.012	0.022	0.024	0.003	0.009
15	0.005	0.007	0.009	0.019	0.023	0.002	0.007
20	0.004	0.006	0.008	0.016	0.022	0.002	0.006
25	0.004	0.005	0.006	0.015	0.022	0.002	0.005
30	0.003	0.004	0.006	0.015	0.022	0.002	0.004
35	0.003	0.004	0.005	0.014	0.022	0.002	0.004
40	0.003	0.004	0.005	0.014	0.021	0.002	0.004
45	0.003	0.003	0.005	0.013	0.021	0.002	0.004
50	0.003	0.004	0.005	0.013	0.021	0.002	0.004
55	0.003	0.004	0.005	0.013	0.022	0.002	0.004
60	0.003	0.004	0.006	0.014	0.022	0.003	0.004
65	0.004	0.005	0.006	0.014	0.022	0.003	0.005

Pollutant Name: PM10 Temperature: 50F Relative Humidity: 40%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
10	0.038	0.079	0.082	0.793	0.534	0.036	0.087
15	0.026	0.055	0.057	0.560	0.400	0.030	0.060
20	0.019	0.040	0.042	0.420	0.311	0.026	0.044
25	0.014	0.030	0.032	0.357	0.250	0.023	0.035
30	0.012	0.024	0.026	0.312	0.209	0.022	0.030
35	0.010	0.021	0.022	0.284	0.180	0.022	0.026
40	0.009	0.018	0.020	0.270	0.161	0.023	0.024
45	0.008	0.017	0.018	0.270	0.149	0.024	0.023
50	0.008	0.017	0.018	0.285	0.143	0.028	0.023
55	0.008	0.018	0.019	0.313	0.142	0.033	0.025
60	0.009	0.019	0.020	0.354	0.146	0.041	0.028
65	0.011	0.022	0.023	0.409	0.156	0.053	0.032

SCREEN3 Model Output for Criteria Pollutants: CO, NO_x, SO_x, and PM_{10}

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

VIEJAS HOTEL REMEDIAL GRADING AND SITE PREPARATION - CO

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                  =        AREA
   EMISSION RATE (G/(S-M**2))   =     .122720E-04
   SOURCE HEIGHT (M)            =      3.0000
   LENGTH OF LARGER SIDE (M)    =    103.6000
   LENGTH OF SMALLER SIDE (M)   =    103.6000
   RECEPTOR HEIGHT (M)          =     10.0000
   URBAN/RURAL OPTION           =       RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC           U10M   USTK   MIX HT   PLUME   MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)    HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   28.24        1    1.0    1.0   320.0    3.00     44.
   100.   62.45        2    1.0    1.0   320.0    3.00     45.
   200.   69.94        4    1.0    1.0   320.0    3.00     45.
   300.   70.13        5    1.0    1.0 10000.0    3.00     45.
   400.   67.38        6    1.0    1.0 10000.0    3.00     45.
   500.   69.06        6    1.0    1.0 10000.0    3.00     45.
   600.   66.91        6    1.0    1.0 10000.0    3.00     45.
   700.   63.00        6    1.0    1.0 10000.0    3.00     45.
   800.   58.61        6    1.0    1.0 10000.0    3.00     45.
   900.   54.22        6    1.0    1.0 10000.0    3.00     43.
  1000.   50.04        6    1.0    1.0 10000.0    3.00     44.
  1100.   46.24        6    1.0    1.0 10000.0    3.00     44.
  1200.   42.77        6    1.0    1.0 10000.0    3.00     44.
  1300.   39.62        6    1.0    1.0 10000.0    3.00     45.
  1400.   36.76        6    1.0    1.0 10000.0    3.00     45.
  1500.   34.17        6    1.0    1.0 10000.0    3.00     45.
  1600.   31.83        6    1.0    1.0 10000.0    3.00     44.
  1700.   29.72        6    1.0    1.0 10000.0    3.00     44.
  1800.   27.81        6    1.0    1.0 10000.0    3.00     45.
  1900.   26.08        6    1.0    1.0 10000.0    3.00     42.
  2000.   24.51        6    1.0    1.0 10000.0    3.00     43.
  2100.   23.15        6    1.0    1.0 10000.0    3.00     45.
  2200.   21.90        6    1.0    1.0 10000.0    3.00     45.
  2300.   20.77        6    1.0    1.0 10000.0    3.00     43.
  2400.   19.72        6    1.0    1.0 10000.0    3.00     43.
  2500.   18.76        6    1.0    1.0 10000.0    3.00     41.
  2600.   17.87        6    1.0    1.0 10000.0    3.00     39.
  2700.   17.04        6    1.0    1.0 10000.0    3.00     38.
  2800.   16.28        6    1.0    1.0 10000.0    3.00     36.
  2900.   15.57        6    1.0    1.0 10000.0    3.00     45.
  3000.   14.92        6    1.0    1.0 10000.0    3.00     45.
  3500.   12.35        6    1.0    1.0 10000.0    3.00     39.
  4000.   10.45        6    1.0    1.0 10000.0    3.00     31.
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  4500.   8.999        6     1.0     1.0 10000.0    3.00     31.
  5000.   7.864        6     1.0     1.0 10000.0    3.00     43.
  5500.   6.957        6     1.0     1.0 10000.0    3.00     40.
  6000.   6.214        6     1.0     1.0 10000.0    3.00     36.
  6500.   5.599        6     1.0     1.0 10000.0    3.00     32.
  7000.   5.082        6     1.0     1.0 10000.0    3.00     31.
  7500.   4.658        6     1.0     1.0 10000.0    3.00     37.
  8000.   4.292        6     1.0     1.0 10000.0    3.00     43.
  8500.   3.974        6     1.0     1.0 10000.0    3.00     43.
  9000.   3.695        6     1.0     1.0 10000.0    3.00     31.
  9500.   3.450        6     1.0     1.0 10000.0    3.00     31.
 10000.   3.231        6     1.0     1.0 10000.0    3.00     31.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   291.   70.18        5     1.0     1.0 10000.0    3.00     45.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION        MAX CONC     DIST TO    TERRAIN
  PROCEDURE        (UG/M**3)     MAX (M)     HT (M)
--------------    -----------    -------    -------
SIMPLE TERRAIN       70.18          291.         0.
```

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

VIEJAS HOTEL REMEDIAL GRADING AND SITE PREPARATION - NOX

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                 =        AREA
   EMISSION RATE (G/(S-M**2))  =      .289930E-04
   SOURCE HEIGHT (M)           =      3.0000
   LENGTH OF LARGER SIDE (M)   =    103.6000
   LENGTH OF SMALLER SIDE (M)  =    103.6000
   RECEPTOR HEIGHT (M)         =     10.0000
   URBAN/RURAL OPTION          =       RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	66.71	1	1.0	1.0	320.0	3.00	44.
100.	147.5	2	1.0	1.0	320.0	3.00	45.
200.	165.2	4	1.0	1.0	320.0	3.00	45.
300.	165.7	5	1.0	1.0	10000.0	3.00	45.
400.	159.2	6	1.0	1.0	10000.0	3.00	45.
500.	163.2	6	1.0	1.0	10000.0	3.00	45.
600.	158.1	6	1.0	1.0	10000.0	3.00	45.
700.	148.8	6	1.0	1.0	10000.0	3.00	45.
800.	138.5	6	1.0	1.0	10000.0	3.00	45.
900.	128.1	6	1.0	1.0	10000.0	3.00	43.
1000.	118.2	6	1.0	1.0	10000.0	3.00	44.
1100.	109.2	6	1.0	1.0	10000.0	3.00	44.
1200.	101.0	6	1.0	1.0	10000.0	3.00	44.
1300.	93.59	6	1.0	1.0	10000.0	3.00	45.
1400.	86.85	6	1.0	1.0	10000.0	3.00	45.
1500.	80.73	6	1.0	1.0	10000.0	3.00	45.
1600.	75.21	6	1.0	1.0	10000.0	3.00	44.
1700.	70.22	6	1.0	1.0	10000.0	3.00	44.
1800.	65.71	6	1.0	1.0	10000.0	3.00	45.
1900.	61.61	6	1.0	1.0	10000.0	3.00	42.
2000.	57.92	6	1.0	1.0	10000.0	3.00	43.
2100.	54.68	6	1.0	1.0	10000.0	3.00	45.
2200.	51.75	6	1.0	1.0	10000.0	3.00	45.
2300.	49.06	6	1.0	1.0	10000.0	3.00	43.
2400.	46.59	6	1.0	1.0	10000.0	3.00	43.
2500.	44.31	6	1.0	1.0	10000.0	3.00	41.
2600.	42.22	6	1.0	1.0	10000.0	3.00	39.
2700.	40.27	6	1.0	1.0	10000.0	3.00	38.
2800.	38.46	6	1.0	1.0	10000.0	3.00	36.
2900.	36.79	6	1.0	1.0	10000.0	3.00	45.
3000.	35.26	6	1.0	1.0	10000.0	3.00	45.
3500.	29.17	6	1.0	1.0	10000.0	3.00	39.
4000.	24.68	6	1.0	1.0	10000.0	3.00	31.
4500.	21.26	6	1.0	1.0	10000.0	3.00	31.
5000.	18.58	6	1.0	1.0	10000.0	3.00	43.
5500.	16.44	6	1.0	1.0	10000.0	3.00	40.

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  6000.   14.68        6     1.0    1.0 10000.0    3.00      36.
  6500.   13.23        6     1.0    1.0 10000.0    3.00      32.
  7000.   12.01        6     1.0    1.0 10000.0    3.00      31.
  7500.   11.00        6     1.0    1.0 10000.0    3.00      37.
  8000.   10.14        6     1.0    1.0 10000.0    3.00      43.
  8500.   9.389        6     1.0    1.0 10000.0    3.00      43.
  9000.   8.730        6     1.0    1.0 10000.0    3.00      31.
  9500.   8.150        6     1.0    1.0 10000.0    3.00      31.
 10000.   7.634        6     1.0    1.0 10000.0    3.00      31.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   291.   165.8        5     1.0    1.0 10000.0    3.00      45.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------    -------    -------
SIMPLE TERRAIN       165.8           291.         0.
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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

VIEJAS HOTEL REMEDIAL GRADING AND SITE PREPARATION - SOX

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                  =        AREA
   EMISSION RATE (G/(S-M**2))   =     .264020E-05
   SOURCE HEIGHT (M)            =      3.0000
   LENGTH OF LARGER SIDE (M)    =    103.6000
   LENGTH OF SMALLER SIDE (M)   =    103.6000
   RECEPTOR HEIGHT (M)          =     10.0000
   URBAN/RURAL OPTION           =       RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC           U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   6.075        1    1.0    1.0   320.0    3.00     44.
   100.   13.44        2    1.0    1.0   320.0    3.00     45.
   200.   15.05        4    1.0    1.0   320.0    3.00     45.
   300.   15.09        5    1.0    1.0 10000.0    3.00     45.
   400.   14.50        6    1.0    1.0 10000.0    3.00     45.
   500.   14.86        6    1.0    1.0 10000.0    3.00     45.
   600.   14.40        6    1.0    1.0 10000.0    3.00     45.
   700.   13.55        6    1.0    1.0 10000.0    3.00     45.
   800.   12.61        6    1.0    1.0 10000.0    3.00     45.
   900.   11.67        6    1.0    1.0 10000.0    3.00     43.
  1000.   10.77        6    1.0    1.0 10000.0    3.00     44.
  1100.   9.948        6    1.0    1.0 10000.0    3.00     44.
  1200.   9.201        6    1.0    1.0 10000.0    3.00     44.
  1300.   8.523        6    1.0    1.0 10000.0    3.00     45.
  1400.   7.909        6    1.0    1.0 10000.0    3.00     45.
  1500.   7.352        6    1.0    1.0 10000.0    3.00     45.
  1600.   6.849        6    1.0    1.0 10000.0    3.00     44.
  1700.   6.394        6    1.0    1.0 10000.0    3.00     44.
  1800.   5.984        6    1.0    1.0 10000.0    3.00     45.
  1900.   5.610        6    1.0    1.0 10000.0    3.00     42.
  2000.   5.274        6    1.0    1.0 10000.0    3.00     43.
  2100.   4.980        6    1.0    1.0 10000.0    3.00     45.
  2200.   4.712        6    1.0    1.0 10000.0    3.00     45.
  2300.   4.468        6    1.0    1.0 10000.0    3.00     43.
  2400.   4.242        6    1.0    1.0 10000.0    3.00     43.
  2500.   4.035        6    1.0    1.0 10000.0    3.00     41.
  2600.   3.845        6    1.0    1.0 10000.0    3.00     39.
  2700.   3.667        6    1.0    1.0 10000.0    3.00     38.
  2800.   3.502        6    1.0    1.0 10000.0    3.00     36.
  2900.   3.351        6    1.0    1.0 10000.0    3.00     45.
  3000.   3.211        6    1.0    1.0 10000.0    3.00     45.
  3500.   2.656        6    1.0    1.0 10000.0    3.00     39.
  4000.   2.248        6    1.0    1.0 10000.0    3.00     31.
  4500.   1.936        6    1.0    1.0 10000.0    3.00     31.
  5000.   1.692        6    1.0    1.0 10000.0    3.00     43.
  5500.   1.497        6    1.0    1.0 10000.0    3.00     40.
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  6000.   1.337        6     1.0     1.0 10000.0    3.00     36.
  6500.   1.204        6     1.0     1.0 10000.0    3.00     32.
  7000.   1.093        6     1.0     1.0 10000.0    3.00     31.
  7500.   1.002        6     1.0     1.0 10000.0    3.00     37.
  8000.   .9234        6     1.0     1.0 10000.0    3.00     43.
  8500.   .8550        6     1.0     1.0 10000.0    3.00     43.
  9000.   .7950        6     1.0     1.0 10000.0    3.00     31.
  9500.   .7422        6     1.0     1.0 10000.0    3.00     31.
 10000.   .6952        6     1.0     1.0 10000.0    3.00     31.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   291.   15.10        5     1.0     1.0 10000.0    3.00     45.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------    -----------    -------    -------
SIMPLE TERRAIN       15.10          291.         0.
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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

VIEJAS HOTEL REMEDIAL GRADING AND SITE PREPARATION - PM10

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =         AREA
   EMISSION RATE (G/(S-M**2)) =      .180900E-05
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)  =     103.6000
   LENGTH OF SMALLER SIDE (M) =     103.6000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	4.162	1	1.0	1.0	320.0	3.00	44.
100.	9.206	2	1.0	1.0	320.0	3.00	45.
200.	10.31	4	1.0	1.0	320.0	3.00	45.
300.	10.34	5	1.0	1.0	10000.0	3.00	45.
400.	9.932	6	1.0	1.0	10000.0	3.00	45.
500.	10.18	6	1.0	1.0	10000.0	3.00	45.
600.	9.864	6	1.0	1.0	10000.0	3.00	45.
700.	9.287	6	1.0	1.0	10000.0	3.00	45.
800.	8.640	6	1.0	1.0	10000.0	3.00	45.
900.	7.993	6	1.0	1.0	10000.0	3.00	43.
1000.	7.377	6	1.0	1.0	10000.0	3.00	44.
1100.	6.816	6	1.0	1.0	10000.0	3.00	44.
1200.	6.305	6	1.0	1.0	10000.0	3.00	44.
1300.	5.840	6	1.0	1.0	10000.0	3.00	45.
1400.	5.419	6	1.0	1.0	10000.0	3.00	45.
1500.	5.037	6	1.0	1.0	10000.0	3.00	45.
1600.	4.693	6	1.0	1.0	10000.0	3.00	44.
1700.	4.381	6	1.0	1.0	10000.0	3.00	44.
1800.	4.100	6	1.0	1.0	10000.0	3.00	45.
1900.	3.844	6	1.0	1.0	10000.0	3.00	42.
2000.	3.614	6	1.0	1.0	10000.0	3.00	43.
2100.	3.412	6	1.0	1.0	10000.0	3.00	45.
2200.	3.229	6	1.0	1.0	10000.0	3.00	45.
2300.	3.061	6	1.0	1.0	10000.0	3.00	43.
2400.	2.907	6	1.0	1.0	10000.0	3.00	43.
2500.	2.765	6	1.0	1.0	10000.0	3.00	41.
2600.	2.634	6	1.0	1.0	10000.0	3.00	39.
2700.	2.512	6	1.0	1.0	10000.0	3.00	38.
2800.	2.400	6	1.0	1.0	10000.0	3.00	36.
2900.	2.296	6	1.0	1.0	10000.0	3.00	45.
3000.	2.200	6	1.0	1.0	10000.0	3.00	45.
3500.	1.820	6	1.0	1.0	10000.0	3.00	39.
4000.	1.540	6	1.0	1.0	10000.0	3.00	31.
4500.	1.327	6	1.0	1.0	10000.0	3.00	31.
5000.	1.159	6	1.0	1.0	10000.0	3.00	43.
5500.	1.026	6	1.0	1.0	10000.0	3.00	40.

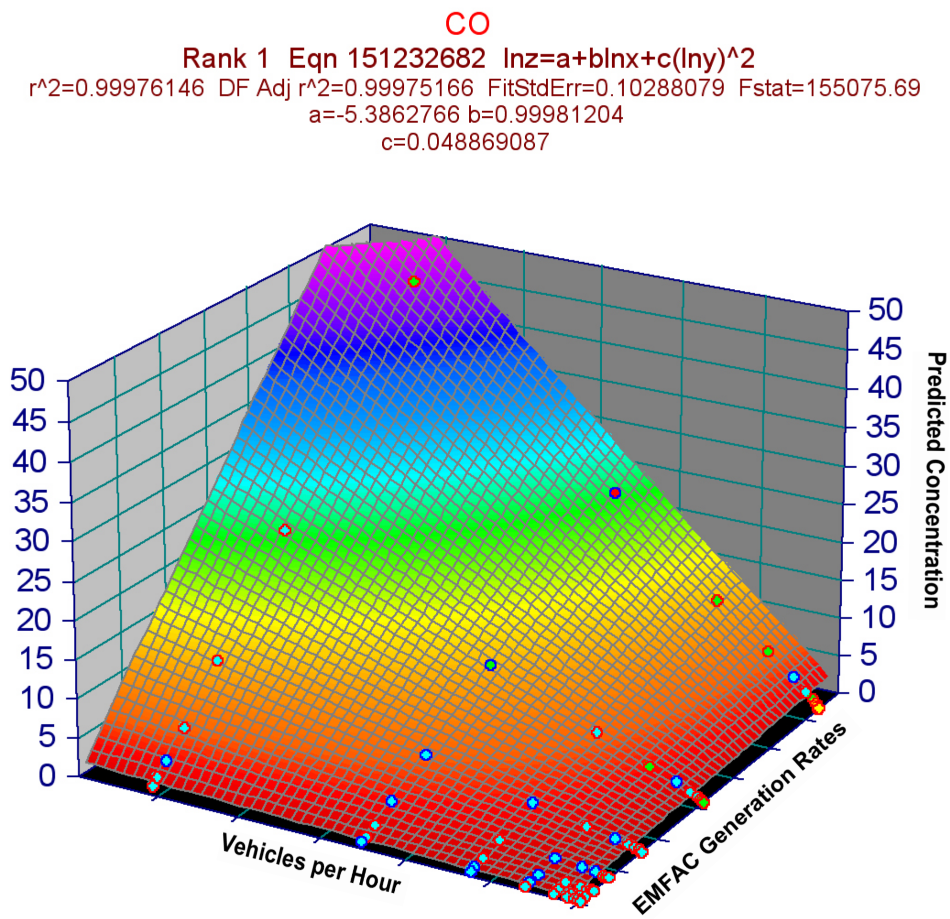
```
  6000.   .9160        6     1.0     1.0 10000.0    3.00     36.
  6500.   .8253        6     1.0     1.0 10000.0    3.00     32.
  7000.   .7492        6     1.0     1.0 10000.0    3.00     31.
  7500.   .6866        6     1.0     1.0 10000.0    3.00     37.
  8000.   .6327        6     1.0     1.0 10000.0    3.00     43.
  8500.   .5858        6     1.0     1.0 10000.0    3.00     43.
  9000.   .5447        6     1.0     1.0 10000.0    3.00     31.
  9500.   .5085        6     1.0     1.0 10000.0    3.00     31.
 10000.   .4763        6     1.0     1.0 10000.0    3.00     31.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   291.   10.35        5     1.0     1.0 10000.0    3.00     45.

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION         MAX CONC     DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       10.35          291.         0.
```

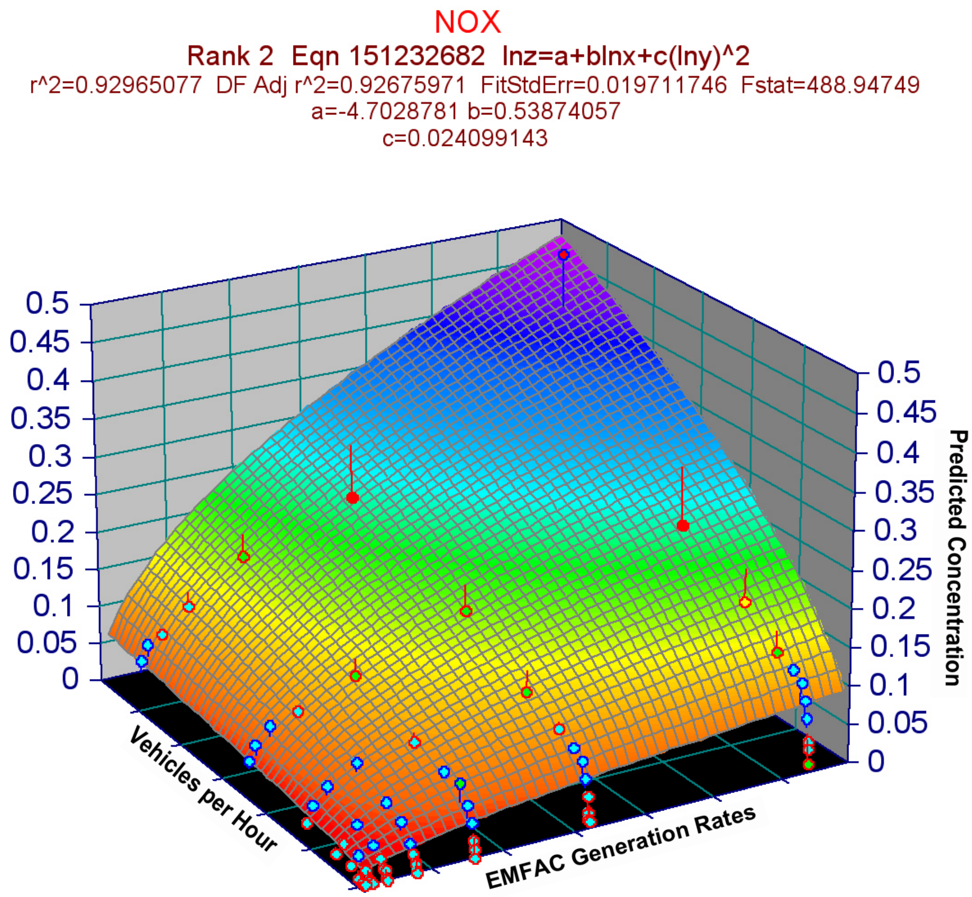
CALINE4 SOLUTION SPACE RESULTS – SCENARIO CO



Rank 1 Eqn 151232682 $\ln z=a+b\ln x+c(\ln y)^2$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9997614637	0.9997516609	0.102880788	155075.68815

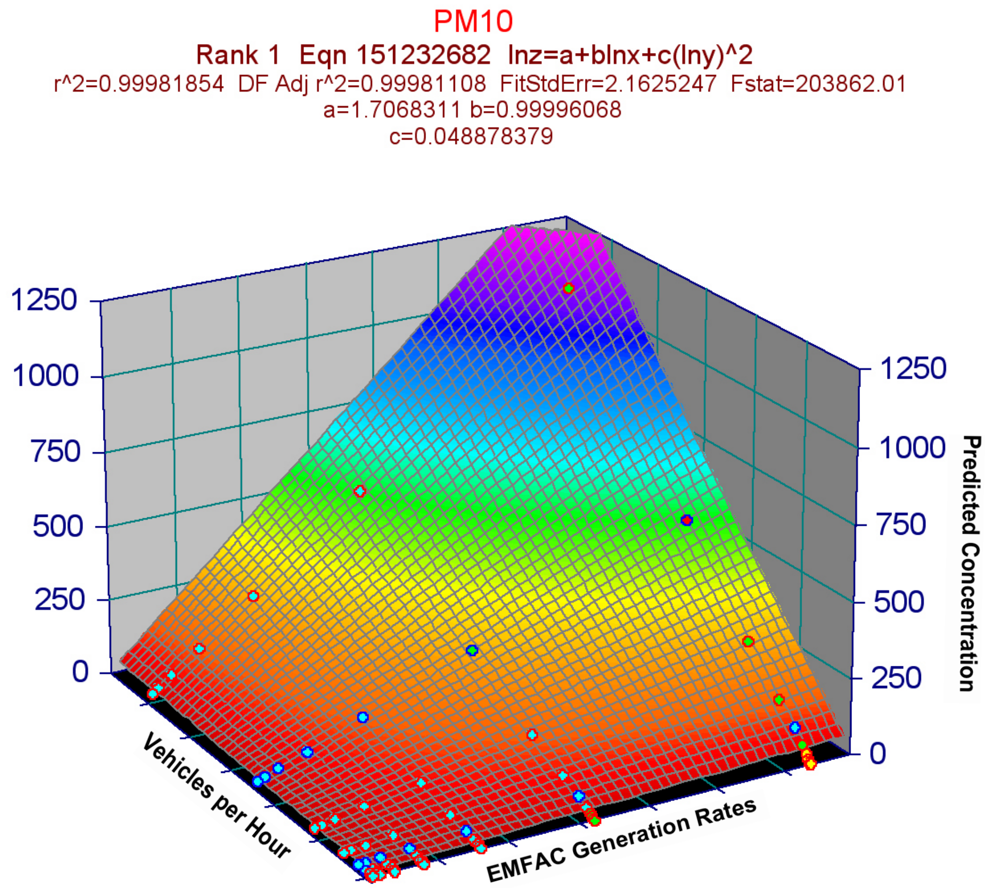
CALINE4 SOLUTION SPACE RESULTS – SCENARIO NO_X



Rank 1 Eqn 151232653 $\ln z=a+bx^{0.5}+c(\ln y)^2$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9311638335	0.9283349499	0.0194986151	500.50814223

CALINE4 SOLUTION SPACE RESULTS – SCENARIO PM_{10}



Rank 1 Eqn 151232682 $\ln z = a + b\ln x + c(\ln y)^2$

r^2 Coef Det	DF Adj r^2	Fit Std Err	F-value
0.9998185376	0.9998110803	2.1625247335	203862.00724

INDEX OF IMPORTANT TERMS